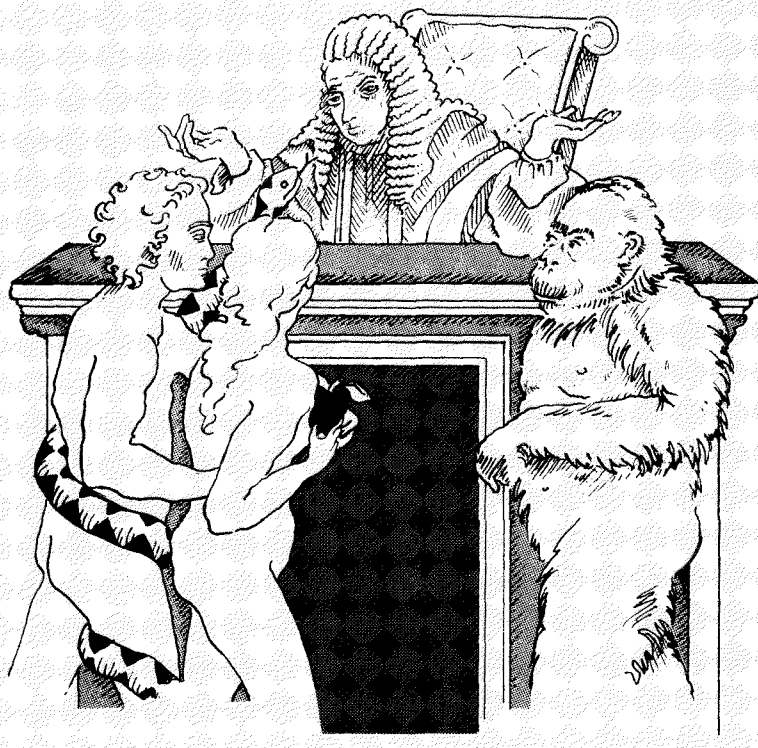
Creation/Evolution



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FORTHCOMING SYMPOSIA

American Society of Biological Chemists Annual Meeting, April 18–21, to be held at the New Orleans Marriott Hotel. Among the major symposia planned is one entitled "The Creationist Attack on Science," to take place at 10:00 A.M. on April 19.

"Public Schools and the First Amendment," April 20–21, at the Indianapolis Downtown Hilton. This program will be sponsored by the Indiana University School of Education, School of Continuing Studies, and Phi Delta Kappa and will feature lectures and debates on the hottest political-educational issues of the eighties, including sex education, values clarification, school prayer, textbook censorship, the New Right vs. the "Religion of Secular Humanism," and, of course, the creation-evolution controversy. Among the debates scheduled is one on creationism and the public schools. The speakers for the various lectures and debates include such luminaries as Bishop James Armstrong, president of the National Council of Churches; Bradford Chambers, director of the Council on Interracial Books for Children; Howard Kirschenbaum, coauthor of *Values Clarification*; Wayne Moyer, director of the National Association of Biology Teachers; Dorothy Massie of the Teachers Rights Division of the National Education Association; Barbara Parker of the *American School Board Journal*; Reverend Tim LaHaye, author of *The Battle for the Mind* and a founder of the Moral Majority; Kelly Segraves, director of the Creation-Science Research Center; and Homer Duncan of World Wide Missionary Crusade, Inc., and author of *Secular Humanism: The Most Dangerous Religion in AMerica.* The effort is to produce an entirely balanced presentation of all the major issues. Speakers on both sides of each concern will be represented. For information, write Carol Madison, Conference Bureau, Indiana Memorial Union L-9, Indiana University, Bloomington, IN 47405, or call (812) 337-4661.

American Physical Society Meeting, April 26, in Washington, D.C. The Committee on Education will present a program on creationism and evolution, featuring talks by Wayne Moyer, Stephen Brush, and others. For details, contact Bernard Silbernagle, Exxon Research and Engineering, Co., Box 45, Linden, NJ 07036.

CONTINUED ON INSIDE BACK COVER

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Answers to the Standard Creationist Arguments

Kenneth Miller

This spring, a pre-recorded debate between Dr. Russell Doolittle of the University of California at San Diego and Dr. Duane Gish of the Institute for Creation Research will be aired over national television. In this debate, produced by Jerry Falwell and taped this past October, Dr. Doolittle made an excellent case for the exclusion of creationism from science classrooms. He argued its religious nature and its failure to meet the standards of scientific investigation. Dr. Gish, in a stunning presentation, made an effective summary of the standard creationist debate arguments. Because his performance will be so widely viewed, the points he made will become the creationist arguments most familiar to millions of television viewers. We will see them crop up again and again in school board controversies, legislative battles, and court cases. It would be practical, therefore, that answers to these standard arguments be made available. The purpose of this article is to provide them.

Such debates, of course, are neither part of the scientific process nor a contribution of anything to scientific understanding. Their purpose is political; so scientists participate only in the hopes of making them educational. The Doolittle-Gish debate was no exception. While many in the overwhelmingly one-sided audience may have been delighted with Dr. Gish's performance, it fell sadly short of anything that could be recognized as scientific argument.

The Creation Model

The most remarkable failure—and the most obvious—was Gish's lack of a single sentence during the entire debate which described "the creation model." He made his whole presentation a game of "hide the ball," never once revealing what his "theory" or "model" was. The closest he came was when he said:

> According to the concept of creation, or, as it may be called, *the creation model*, the origin of the universe and all living forms came into being through

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Ken Miller is a professor of biology at Brown University in Rhode Island. He has so successfully debated Henry Morris on two recent occasions that ICR's Acts & Facts *declared him to be "the most effective evolutionist debater Dr. Morris has encountered to date."*

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> the designed purpose and deliberate acts of a supernatural creator. The creator, using special processes not operating today, created the stars, our solar system, and all living types of plants and animals.

Dr. Gish did not say *when* that creation event occurred, and he did not say whether all the animals and plants were created in their present forms at the same time or whether they were created in different forms and at different times. These are not trivial points because, without them, "creation science" does not make a single scientific statement. Without any details on the creation "theory" being presented, Dr. Doolittle had no way to discuss it.

While this tactic may be an excellent debating strategy, one that keeps one's opponent on the defensive due to a focusing of the attack on *his* ideas alone, it is very bad science. A theory that is kept hidden from discussion cannot be analyzed on its own merits. Therefore, if we were to declare that Dr. Gish had "won" the debate, we would only be saying that evolution had been questioned, not that a case had been made for creation.

Gish, of course, would disagree. His opening statement was, "There are two fundamentally different explanations for the origin of the universe and the living things it contains." This statement implies that, if he can disprove or cause people to doubt evolution, he has proved creation. But such a view constitutes cultural arrogance. There are a number of different hypotheses concerning origins that have been postulated by scientists in the past. One could name spontaneous generation, for example. The hypothesis of panspermia is the suggestion that life originated elsewhere and came to this planet through space. Various cyclical hypotheses propose fluctuation or change back and forth. And the number of religious ideas are legion.

The only time we find ourselves limited to just two "fundamentally different explanations" is when we compare naturalism and supernaturalism. But Gish is foolish if he thinks that he represents the infinite number of supernatural explanations and that Dr. Doolittle was to represent all the naturalistic possibilities. Furthermore, for Gish to take such a position, he would have to deny that creationism is a part of natural science. This would effectively bar it from any natural science class and thereby end the debate. Supernatural science must depend on supernatural evidence—not evidence from the natural world. To the extent that creationists argue from natural evidence and propose naturalistic mechanisms for their creation model (the model Gish did not state in the debate), they place themselves in the naturalistic camp with the evolutionists.

After misstating the controversy in his first statement, Dr. Gish went on to misstate the theory of evolution in his second and following statements. He said:

> According to the theory of evolution—or, as we should more properly call it, "the evolution model"—everything in our universe has come into being

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> through mechanistic processes, which are ascribed to properties inherent in matter. No supernatural intervention of any kind was involved. In fact, by definition, God is excluded. Thus, while not all evolutionists are atheists, the theory of evolution *is* an atheistic theory.

Such a clear and effective misrepresentation of his opponent's position was a beautiful rhetorical maneuver—one which was almost guaranteed to win the approval of Gish's audience while at the same time placing Dr. Doolittle in a very awkward position. This is a classic case of winning an argument by distorting the idea you are challenging. The key issue in this debate should have been whether living organisms on earth have changed (evolved) through the hundreds of millions of years for which science has excellent fossil records and other evidences or whether living things have remained unchanged from an initial creation event which occurred no more than about ten thousand years ago. Instead, Dr. Gish made the key issue of the debate a theological question over whether or not God exists. His arguments for a creator involved appeals to the second law of thermodynamics, design, the supposed mathematical improbability of things arising naturalistically, and "gaps" in the fossil record. He seemed to maintain the viewpoint that, if he could prove the existence of God, he would thereby have disproved the theory of evolution. Since Dr. Doolittle did not come to discuss theology and as that is not his specialty, the result was that the two debaters found themselves talking about two different issues.

The reason evolutionary science does not make references to a creator is for the same reason that mathematics, cell biology, organic chemistry, and hydraulic engineering do not make references to a creator: none of these are theological subjects. They are ***nontheistic***, as all scientific and mathematical systems must be. Imagine how ridiculous Dr. Gish would have sounded had he declared, "Thus, while not all those who do long division are atheists, the practice of long division *is* an atheistic practice." After all, "no supernatural intervention of any kind" is involved. It must be that elementary school teachers who instruct our children in nonmiraculous math are teaching "a basic dogma of agnosticism, humanism, and atheism."

I would like to add that Dr. Gish's suggestion that evolution and creation are mutually exclusive ideas is insulting to me personally (I am a Roman Catholic) as well as to the great majority of scientists of Christian, Jewish, Moslem, Hindu, Buddhist and other faiths who understand quite well that biological evolution is a scientifically supported fact. The theory of evolution is not inconsistent with the belief in a created universe *per se.* However, it *is* inconsistent with the creationist belief in a universe that was created no more than ten thousand years ago in which all living things were created at the same time in essentially the same form they take today. But this is the very "creation model" that Dr. Gish would not discuss.

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The Nature of Science

After misrepresenting the controversy and evolution, Dr. Gish then went on to misrepresent science, which he accomplished admirably.

> Let us dispense, once and for all, with the notion that this is a debate between science and religion. Each concept of origins is equally scientific and each is equally religious. In fact, neither qualifies as a scientific theory. The first requirement of science is observation. Obviously there were no human observers to the origin of the universe, the origin of life, or, as a matter of fact, to the origin of a single living thing. These events were unique, unrepeatable historical events of the past. . . . Ultimately then, no theory of origin can be considered a scientific theory in the strict sense.

It is crucial for creationists that they convince their audiences that evolution is not scientific, because both sides agree that creationism is not. So, Dr. Gish proposed this ingeniously stringent set of requirements for a scientific theory. He seems to say that not only is science based on observation (which is true) but that it requires eyewitnesses to all events (which is false). This is a strange suggestion. No one has ever *seen* an atom, just its effects. Do atoms therefore not exist? The wave and particle aspects of electrons have only been determined by the images they leave on film when certain experiments are performed. These images record *past* events, not present realities. Is subatomic physics then a faith? The same questions could be asked of astronomy, chemistry, and geology—not to mention much of the rest of science. Dr. Gish's overly limited interpretation would wipe away most of the world's evidence for anything.

In fact, even creationism could prove nothing. This is why Dr. Gish had to contradict himself in the debate by saying:

> Although there were no human witnesses to any of these events [of creation], creation can be inferred by the normal methods of science: observation and logic. . . . Creation and evolution and *inferences* based on circumstantial evidence and predictions based on each model can be tested and compared with that circumstantial evidence.

So which is it? Or perhaps it is neither. Perhaps the creation-evolution controversy should really be a debate over which act of faith is best supported by the circumstantial evidence. This is a strange mixture of religion and science—a mixture that denies we can ever attain knowledge of historical events. Imagine what would happen if Gish's requirements were followed in our courts of law. We could only convict criminals who were directly observed committing their crimes. But since crimes are rarely committed in full view of others, our courts have to take this into account. In both law and science there is a common-sense precident to use circumstantial evidence carefully to resolve questions about natural

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events, even when they are historic, unique, and unwitnessed. Dr. Gish's narrow definition of science is simply self-serving. It is a way of promoting confusion about evolution and bringing the acquired data of hundreds of years of scientific research down to the level of Dr. Gish's brand of faith. Only by such questionable thinking can creationism be seen as an equal and alternate model.

If we ignore the creationist's arbitrary rules of science and compare the two models in the normal way, we find that evolution is scientifically testable, right along with many aspects of creationism. For example, there is observable evidence for evolution. This evidence is found in the fossil record, the phylogenetic trees for living and extinct animals, the geographic distribution of organisms, the phases of embryologic development, observed mutations, observed natural selection, observed geological changes, and laboratory experiments in biology, among other things. Both evolution (which predicts that the evidence will show life has changed through time) and creationism (which predicts an absence of change, except for extinction) are scientifically testable. Dr. Gish would like to pretend this is not true because creationism fails the test of evidence while evolution passes it.

Evolution also predicts a consistent pattern of relationships between animals. This prediction is also testable. For example, if humans appeared to be most closely related to chimpanzees by one criterion, but to butterbeans by another, to chickens by a third criterion, and to bullfrogs by a fourth, there would be no consistent pattern, and evolution would thereby be disproved. But all techniques for determining relationships have consistently given results that fit with the evolutionary prediction. Creationists have recently tried to claim that some data go against the prediction (which shows that creationists also see this prediction as significant), but their arguments are all based on incorrect data. After a century and a quarter of strenuous questioning and testing in many fields, the theory of evolution stands stronger than ever. It could be falsified if it were wrong, but efforts to falsify it have continually failed. Evolution unites genetics, physiology, paleontology, embryology, biogeography, systematics, and geology into a coherent whole. And this is another reason why evolution is a good scientific theory.

The Nature of the Universe

Dr. Gish next implied that the theory of evolution says that the universe created itself. Nothing could be further from the truth. Notions of how the universe originated are altogether outside the province of science. Such questions of first cause properly belong to the realms of philosophy and theology. Evolution speaks only of change through time. The universe could have begun in any number of ways, and yet we would still have to separately learn whether or not biological evolution

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takes place and existing life forms evolved from ancestral ones.

Nonetheless, Dr. Gish spent a great deal of time insisting that the universe could not have created itself and that a creator must therefore exist. He simply ignored the possibility that a creator might have formed a universe in which evolutionary processes then brought about the formation and development of living things. Yet, if such events actually did take place, Dr. Gish's particular brand of creationism would be falsified—a possibility he refused to consider.

"According to evolution theory," he said, "disorder spontaneously generated order" by means of the "Big Bang." That is to say, a cosmic explosion created the orderly cosmos we see today in a manner that is actually contrary to the second law of thermodynamics. Dr. Gish was wrong again, but this argument went over well because people naturally visualize an explosion as *disorderly* and the present state of the universe as *orderly*. Yet, in a thermodynamic sense, *order* means "energy available for work" and *disorder* means "energy unavailable for work." Therefore it is actually true that the universe was more orderly at the time of the "Big Bang" but has grown progressively more disorderly as it has expanded. Dr. Gish was simply playing on the popular meaning of these words while speaking of the science of thermodynamics which uses them differently.

Astronomers are well aware that the universe, taken as a whole, is "running down" in accord with the second law of thermodynamics. Evolution harmonizes with that. There is nothing in evolutionary theory that states the universe has ordered itself. *Cosmic evolution* is what happens as the universe runs down. It is the second law in action. *Biological evolution* is what happens in pockets of the universe where the process temporarily reverses itself due to greater losses of energy elsewhere. For example, in our pocket of the universe there is an increase in complexity associated with living organisms and their evolution. This is made possible by the *decrease* in available energy in the sun. The energy loss of the sun provides thousands of times the energy demanded by the second law to account for the increase in complexity on our planet. Dr. Gish therefore set up a straw man with his claim that the second law of thermodynamics prohibits evolution.

In his rebuttal, however, Gish argued that receiving energy from the sun was not sufficient to create life. He claimed that there must also be an "energy conversion machine," much like a car's motor, and a "control system," much like a car's driver, if there is to be an evolutionary increase in complexity. He argued that life has these properties infused into it by the creator but inanimate matter does not.

However, in actual fact, the raw, uncontrolled application of energy *does*, under certain conditions, cause the formation of complex molecules (although not automobiles!). Stanley Miller and Harold Urey demonstrated this in their famous experiment nearly thirty years ago. Furthermore, inanimate matter can often increase in complexity in nonbiological ways. Snowflakes form from water

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and dust all by themselves, and complex and energetic whirling wind storms also arise spontaneously from random converging wind systems. Where are the divine "energy conversion machines" and "control systems" in these phenomena?

The Laws of Probability

The next argument was an old standard. Dr. Gish noted the great complexity of living cells and the various other forms of life on earth. He argued that the mathematics of probability would render it impossible for life to develop from nonlife all by itself, no matter how much time was allowed:

> Most proteins consist of several hundred amino acids, each arranged in precise sequence, and DNA and RNA usually consist of *thousands of nucleotides* also arranged in precise order. The number of different possible ways these subunits can be arranged is so incredibly astronomical that it is literally *impossible* for a single molecule of protein or DNA to have been generated by chance in five billion years.

He backed up this claim by citing calculations by Hubert Yockey. But these calculations are based on two false assumptions which stack the deck against evolution: first, that a *particular* nucleotide or amino acid sequence must assemble completely by chance—and only that *specific* sequence will be accepted—and, second, that no small nucleotide chains are capable of self-replication.

Yet, in the globin protein sequence (the polypeptide part of hemoglobin) only seven amino acids, out of more than one hundred, are always the same when we examine the many globins which are used by different organisms. If the creationist calculations are done with this fact in mind, we would discover that such sequences form very quickly. Second, the sequences would not have to assemble from scratch. Recent work by Orgel and Eigen and others has shown that RNA nucleotides can spontaneously form small chains. Furthermore, these small chains can procede to self-replicate. Often when such organic molecules get to be twenty to twenty-five amino acids long, they can spontaneously double their lengths through this replication process. (Indeed, many of the molecules found in living things bear evidence of having evolved in exactly this way.) The net result is thousands and thousands of variant copies being produced quickly. Therefore, the sequences that Dr. Gish says could *never* form would in fact self-assemble in a few months or years, given the whole earth as a laboratory. Since Yockey's calculations do not allow for this replication, his mathematical results are light years away from the truth.

Gish argued next that hundreds of different functional proteins would have had to form simultaneously. He assumed that this also would be another impossibility. Yet, there are numerous papers with copious data showing that the

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many modern proteins appear to have derived from a few ancestral proteins. He also assumed that, if modern cells have two hundred proteins, the earliest protocells also had two hundred proteins. A wealth of experimental results refutes that assumption as well. However, in spite of the open availability of all this data, the creationists go right on making these same tired old statements.

Reading these creationist impossibility calculations always brings to mind other impossibility calculations, some made by eminent scientists of their day, which were also based on erroneous assumptions. Lord Kelvin calculated that powered aircraft could never fly. Others calculated that steamships could never carry enough fuel to cross the Atlantic. One should always keep in mind the computer-age dictum: "Garbage in—garbage out."

The Fossil Record

The key claim of evolution is descent with modification, the idea that animals alive today evolved from earlier forms. All the previous talk about the supposed impossibility of life evolving from nonlife says nothing about descent. Evolution is not really a concept of origins. A creator could have created life and then everything could have evolved from there. Such a fact would still falsify Dr. Gish's unstated creation model.

In order to defeat the notion of descent, Dr. Gish claimed that "the missing links are still missing," that there are gaps in the fossil record so severe that the record simply does not show evolution. This is a shocking set of untruths.

The fossil record not only documents evolution but the very existence of the fossil record was the force that drove unwilling scientists to admit nearly two centuries ago that living forms had changed (evolved). This record shows intermediate form after intermediate form. There is a long series of intermediates linking reptiles with mammals. There are evolutionary sequences showing the evolution of the horse, the elephant, sea urchins, snails, major groups of plants, and many other animals now extinct. Furthermore, these fossils show an orderly succession which fully documents the evolutionary tree of life.

The reason Gish says that intermediate forms do not exist is because his model requires that he explain them all away. For example, *Archaeopteryx*, a clear intermediate between reptiles and birds which in some ways is more closely linked with the little dinosaurs of the period than with later birds, is declared by Gish to be "100 percent bird." Why? Because it has feathers. This is where he draws the line. Yet, if one really wanted to discuss the *Archaeopteryx* fossils in detail, one should be aware that several fossilized *Archaeopteryx* skeletons were discovered before one was found with feathers preserved. How were these specimens first classified? They were thought to be reptiles and were placed in museums alongside other small dinosaurs. In short, *Archaeopteryx* was an animal

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whose skeletal structure was reptilian but upon whose skin the first feathers had appeared. Just how much more intermediate does something have to be?

Since the fossil record is actually very complete and is getting better all the time with continuing new discoveries, it is only by refusing to see what is plain that creationists can deny that the fossil record supports evolution. And even if these gaps were as profuse as Gish claims, the fossil record would still reveal an impressive lineage for animals living today. It would still reveal that the further back one goes in time, the more numerous the extinct forms and the less similar they are to modern forms.

Nonetheless, Gish made an impressive-sounding case by citing "authorities" supportive of his claims. In a classic out-of-context quote he voiced the words of Dr. Corner, a Cambridge botanist, who wrote, "Much evidence can be adduced in favor of evolution, but I still think that to the unprejudiced the fossil record of plants is in favor of creation." However, what Dr. Corner actually said was that ". . . the fossil record of *higher* plants is in favor of *special* creation" (emphasis added). What did Corner mean by that? He meant that the major form of higher plant (the angiosperms or flowering plants) appeared on earth about 135 million years ago, and we have no good fossil evidence as to what forms they evolved from. Corner meant to emphasize in his statement just that lack of ancestral evidence and pointed out that the higher plants appear so suddenly that one could almost believe that they had been *specially* created—just as if a creator had said, "Let there be angiosperms," and so they appeared.

One might get the impression that Dr. Gish's creation model suggests exactly that: that the appearance of the angiosperms represents a specific and individual creative act in which they were formed from scratch by a creator 135 million years ago. Although Dr. Gish seemed quite willing to leave that false impression with his listeners, he in fact holds to a radically different view.

His real position is that all animals and plants were created at the same time (or in six solar days) only about ten thousand years ago. Such a view means that angiosperms were *always* present and their fossils should be found in the oldest rocks available. However, there is no evidence of their existence prior to 135 million years ago, while other land plants appear in the record hundreds of millions of years earlier. The fact that various life forms appear in various places along the geologic column is actually deadly evidence against Gish's notion of a single creation event. But he gets away with implying this evidence is consistent with his creation model because he never really presents this model.

Human Evolution

The big emotional issue among creationists is human evolution. It might be safe to say that all their previous arguments exist only to support the notion that

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humans are in no way linked to the other animals. To this end, Gish quoted Sir Solly Zuckerman in order to claim that *Australopithecus* did not walk upright. The quote is dated 1970. Since then, several pelvic fossils and one nearly complete *Australopithecus* skeleton have been found. There is now not the slightest doubt that this animal walked upright, much as we do. But Dr. Gish quoted from a decade-old source and therefore ignored the latest findings.

His information on Lucy is no better. Gish declared, "Since Johanson describes this creature as totally ape from the neck up, the only basis for the idea that this creature was a link between man and ape is a notion that it did walk upright."

But Johanson never claimed that Lucy was an ape. He simply stated that from the neck up she was essentially a hominid with a number of apelike *features*. And, from the neck down, she should be linked with the human family due to her fully upright stature. She and her colleagues walked just as we do today. This is clear from the detailed anatomy of the hip, knee, and ankle, not to mention the 3.7 million-year-old footprints in the volcanic ash at Laetoli, Tanzania. Extensive comparative anatomy and biomedical analysis render this judgment of Lucy's locomotion to be far more than a guess. The value of this discovery is that it shows how hominid bipedalism preceded both tool use and the modern human cranial capacity.

To conclude his attack on human evolution, Dr. Gish reminded his audience of the Piltdown Man hoax. This is surprising since the hoax was revealed and exposed not by anti-evolutionists but by scientists. The same techniques that exposed the Piltdown hoax now verify the authenticity of the work done by Johanson and others. However, Dr. Gish refuses to accept in one case the same sort of dating evidence he is delighted to use against evolutionists in another.

Gish also mentioned Nebraska Man, for which the evidence turned out to be a number of fossilized pig's teeth. However, what he failed to mention was that since the discovery of Nebraska Man in 1922, it was contested by scientists worldwide. In fact, in every case that creationists have pointed out that scientists made errors, the errors were originally discovered by scientists themselves—not by creationists who have made no significant contribution to the literature of evolution.

The Age of the Earth

In his rebuttal to Dr. Doolittle's remarks about "scientific creationism" requiring a young earth and universe, Dr. Gish declared, "This debate is not about the time of origins, but about the 'how' of origins. These are separate questions." Not only was there no agreement to ignore the question of time made prior to the debate but the idea that the earth and universe are only a few thousand years old is a major plank in Gish's model.

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It is true that some creationists accept the theory of an old earth and universe. But are they the creationists who are pushing for equal time in the public schools? It doesn't seem so when one reads the definitions of creationism that appear in the Arkansas law. Creationism is defined there as including "explanation of the earth's geology by catastrophism, including the occurrence of a worldwide flood and a relatively recent inception of the earth and living kinds." This view is considered the only valid form the creation model can take. It is seconded in the major creationist public school text books, particularly *Origins: Two Models* by Richard Bliss and *Scientific Creationism* edited by Henry Morris. These books argue for an earth and universe that are only ten thousand years in age. To gain admittance into the Creation Research Society, one must swear to a statement that includes the words: "All basic types of living things, including man, were made by direct creative acts of God during Creation Week as described in Genesis.'

Creationists should therefore be willing to answer critiques of this aspect of their model, even if it is the weakest plank in their platform. It is to Gish's credit that he did make a concession and speak about the age of the moon. He declared that, when scientists dated the moon rocks, "they got ages of all kinds—from over a few thousand to many multiplied billions of years. They simply selected the date that had to be right, which had to be 4.6 billion."

But Gish was wrong on two counts. First, *every single rock* from the moon for which rubidium-strontium isochrons could be determined (the most sensitive and reliable way of radiometric dating) showed an age of formation of *billions* of years. Second, the "picking and choosing" of dates, which he criticizes, is not to find dates that fit with evolution. The "picking and choosing" is really over which rocks have not been altered by outside factors in such a way that they would yield inaccurate dates. Just as you don't give up on the notion of ever knowing what time it is because some watches are broken, those who do radiometric dating don't give up determining the age of the earth and moon just because some rocks are known to be unreliable measures.

The Public Schools

In a stunning close that appealed to the audience's sense of fair play, Dr. Gish compared creationists to Galileo facing opposition from the "stifling dogma" of the establishment. He claimed that there could only be two reasons why scientists were against equal time for creationism in public school science classes: either they were practicing an insulting form of paternalism designed to protect students from error and indoctrinate them in evolutionary ideas, or they were fearful that evolution could not survive in the free marketplace of ideas.

What the audience may not have realized is that this appeal is common to

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every pseudoscientific group. The very same arguments could be used to intimidate the schools into giving equal time to astrology, hollow-earth theory, "ancient astronauts," and the search for Atlantis. Furthermore, if creationism is being proposed in the name of academic freedom, why is legislation involved? In *not one* of the fifty states has evolution been *legislated* into the classroom. Evolution is taught for the same reason that the cell theory and germ theory of disease is taught: each theory successfully fought it out in the scientific arena and convinced the scientific community (including the teachers of science in public schools). What Dr. Gish is trying to encourage is the use of public pressure to determine what is and what is not science, and he is trying to force creationism into the schools through the back door without first winning the scientific debate in the way that all past theories have had to do.

Creationists are not being persecuted by scientists; they have deliberately *avoided* the scientific community. And here we could reverse Dr. Gish's claim: creationists must be fearful that creationism cannot survive a careful scientific scrutiny in the free marketplace of ideas. This must be why creationism is the only hypothesis in need of special legislative protection. Most scientists, on the other hand, support the freedom of local school boards to determine the scientific content of their instruction. It is ironic that the only state in which citizens are *not* free to make such choices is Louisiana, where a law supported by creationists has taken that freedom away.

The reasons, then, that scientists are against equal time for creationism are that it would remove academic freedom and local control from the public schools and that it would unconstitutionally promote sectarian religion.

That religion is the real issue behind the scenes is made plain by a statement by Dr. Henry Morris, director of the Institute for Creation Research, of which Dr. Gish is associate director. In a February 1979 cover letter mailed with the Institute's publication *Acts & Facts*, Dr. Morris wrote:

> Although our message to the educational world necessarily and properly stresses the scientific aspects of creationism, we can never forget we are actually in a spiritual battle and need always to be clothed in God's whole armor (Ephesians 6:11) if the creation witness is to continue to grow in its ministry to a world that needs desperately to know its Creator and Savior.

Dr. Gish stated on page twenty-four of his book, *Evolution, The Fossils Say No!:*

> By creation we mean the bringing into being of the basic kinds of plants and animals by the process of sudden, or fiat, creation described in the first two chapters of Genesis.

This is the hidden creation model. So now we see why Dr. Gish didn't wish to mention it in debate. It would have revealed the real purpose behind the crea-

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tion movement: to bring bibilical fundamentalism into the science classroom.

Dr. Gish's audience was made up of sincere and well-meaning Christians who desired to defend God and promote fairness. They were not aware of how his appeals would effectively misdirect their energies in ways harmful both to science and religious freedom. Yet, this is how far creationists must go in order to buoy up a discarded and disproved theory of science and a minority position in religion. Citizens should not be misled into subsidizing sectarian religious pseudoscience in the public school science classroom.

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A NEW BOOK:
EVOLUTION VS. CREATION

This informal publication of seventy-seven pages consists of a collection of short essays, lecture notes, and an annotated bibliography on the scientific and philosophical bases of the creation-evolution controversy. The authors, Frank Awbrey and William Thwaites, are biology professors at San Diego State University. On three occasions they have invited leaders of the creationist movement to participate in a semester-long course designed to view the creation "model" as if it were a legitimate scientific hypothesis. *Evolution vs. Creation* reflects the conclusion of the authors: that the creation model is void of scientific merit.

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A Closer Look at Some Biochemical Data that "Support" Creation

Frank T. Awbrey and William M. Thwaites

"Scientific" creationists insist that scientific data *demand* creation. Yet very few creationist writings contain any data at all. Their "evidence" usually consists of quoting questions raised by scientists (but not the answers), redefining terms to suit their own purposes, misstating evolutionary theory, and implying their own omniscience by saying that evolution is impossible because they cannot imagine how it could happen.

Sometimes, however, creationists interpret data published by scientists without actually presenting the data for the reader to see. They apparently have good reason for withholding this information. One good example relates to the biochemical data that scientists claim agree with morphological, developmental chromosomal, and genetic evidence in showing that humans, chimpanzees, and gorillas all shared a recent common ancestor. Of course, creationists disagree, and some almost infer that evolutionists are involved in some sort of collusion. They say that evolutionists have to search for the rare "right" molecules that seem to support their case, because most biochemical data actually refute the theory of evolution (Gary Parker, *Creation: The Facts of Life*, Creation-Life Publishers, 1980; also *Homology, Embryology, and Vestigial Organs: Common Ancestor or Common Plan?* Institute for Creation Research).

In order to support this argument, ICR creationists list several molecules which they say show that humans seem to be more closely related to quite different organisms than the apes. Here are the relationships they claim:

Molecule	Nearest Relative to Human
Fetal hemoglobin	Horse
Tear enzymes	Chicken
Albumin	Bullfrog
Blood antigen *A*	Butterbean
Cholesterol level	Gartersnake
Milk chemistry	Donkey

These data certainly would contradict the main prediction of evolution. How did

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such an important conclusion slip past the authors of the papers referenced in the creationist books on the subject. When we read those and related papers, here is what we found.

Fetal hemoglobin. Hemoglobin has four globin molecules, each arranged around a central iron atom and a porphyrin ring. Humans have several different hemoglobins. Fetal hemoglobin has two alpha globins and two gamma globins, each with 146 amino acids. Horses don't have gamma globins. Chimpanzees do, and it is identical to that of humans (W. De Jong, *Biochimica et Biophysica Acta*, 251:217–226). From these data, creationists conclude that a molecule that doesn't exist is more similar to a human molecule than is an identical chimpanzee molecule.

Tear enzymes. The enzyme referred to here is lysozyme, which is found in human milk, tears, leukocytes, and so forth. Variants exist in tissues of other species, for example, in chicken egg whites. Prager and Wilson showed that chicken lysozyme differs from human lysozyme by fifty-one out of 130 amino acids (in E. F. Osserman, *Lysozyme*, Academic Press, 1974, pp. 127–141). Chimpanzee lysozyme is identical to human lysozyme. It is apparent that the creationists either had not bothered to look at this paper when they made their claims or they believe that fifty-one is less than zero.

Albumin. Human and chimpanzee albumin differ by six out of 580 amino acids. Human and bullfrog albumins differ so much that they don't cross-react in immunological tests. They are too different to allow this method to be used for estimating the number of amino acid differences (Wallace and Wilson, *Journal of Molecular Evolution 2*, 1972). The supposed evidence for creation is contradicted again by reality.

Blood antigen *A*. This is one of the molecules that determine blood types. They are called glycoproteins because they have sugars attached to a protein. Butterbeans contain a sugar configuration that is similar enough to the glycoprotein sugar that it can react with antibodies directed against the *A* blood type if the butterbean sugar is at a high concentration (Gottschalk, *Glycoproteins*, 1972). Chimpanzees have blood antigens that are identical or nearly identical to those of humans (J. Ruffie, "Immunogenetics of Primates" in *Perspectives in Primate Biology* edited by A. B. Chigrelli, Plenum Press, 1972, p. 217). Butterbeans, having no blood, obviously have no blood antigens.

Cholesterol level. Cholesterol is a simple lipid (a wax) and its structure doesn't vary among species. Furthermore, its concentration can vary several hundredfold in an individual human depending upon diet and genetic background. Therefore, it is a useless molecule for determining genetic similarity. This datum isn't just wrong, it's nonexistent.

Milk chemistry. We have not found a direct comparison of human and chimpanzee milk chemistry. R. E. Sloan, et al., showed that human milk proteins (whey and casein) were much more like macaque milk than donkey milk (*Com-*

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parative Biochemistry and Physiology, 1961, 4:47–62). Human and chimpanzee milk lysozymes are identical. Even this limited comparison disproves the creationist claim that the donkey is our nearest relative based on milk chemistry.

Not to be outdone, and perhaps even inspired by the foregoing ICR arguments, the Laymen's Home Missionary Movement has published an anonymous tract called *The Evolution Theory Examined*. On page fourteen, this missive has a section called "Blood Tests No Proof of Evolution." It reads:

> Blood tests are another argument that evolutionists allege for their doctrine. They put the argument like this: Dog's blood injected into a horse kills the horse; but, man's blood injected into an ape does it very little harm. Hence, they reason, the dog and horse are not nearly related, while man is nearly related to the ape. In reply, we say: Dog's blood is poisonous to most animals, while the blood and blood serum of the sheep, goat, and horse are not poisionous to other animals and man. Hence serums are usually made from these animals, especially from the horse. But no serums for man have been made from apes, because they do not help man. These facts would prove man to be more nearly related to the sheep, goat, and horse than to the ape, if the argument under examination were true.

This bit of fantasy is so outlandish and so contrary to the facts that the usual biologists's response to it is laughter, followed by consternation or anger. First, the article confuses antibody-antigen reactions with poisons. Nineteenth-century physicians experimenting with blood transfusion found that they could give sheep blood to some people—once. A second transfusion always killed the recipient, but it had nothing to do with poisons. Landsteiner's work with blood groups is very well known. Whoever wrote this article should have spent a few minutes reading about blood in any good encyclopedia published since 1900. The foreign blood proteins cause antibodies to build up. With a second transfusion, the antibodies react with the blood cells, causing them to clump together, fatally blocking circulation. The same thing happens in transfusions between persons with incompatible blood groups.

Next, statements in the article about serum are as misinformed as those about transfusions. Serum is used to provide antibodies that protect the body by reacting with a specific substance, such as botulus toxin or rattlesnake venom. Apes are not used for serum production because they are too expensive to maintain. Horses are relatively inexpensive and easier to acquire. One horse produces a lot of serum, thus keeping costs down. All horse-derived serums bear warnings indicating that severe allergic reactions may occur. Many persons have died from such reactions. So much for "harmlessness." The missive continues:

> Again, the thyroid gland of the sheep serves man better when it replaces his than that of the ape, as operations have proved. This also spoils the argument

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> under review. Vaccine matter is taken from cows rather than from apes—another fact against the argument under review. The Abrams Dynamizer, one of the most accurate of blood-testing instruments, proves that the blood reactions of the sheep, goat, and horse are nearer that of human blood than is that of apes. This disproves the argument under examination. We conclude, therefore, that blood tests do not prove man's descent from apes.

This paragraph surpasses the first as an example of sublime ignorance. To begin with, persons with defective thyroids, or whose thyroids have been removed, do not receive thyroid gland transplants from sheep. The organs would quickly be rejected. Such persons receive the *thyroxin*. This thyroid hormone is not a protein but an amino acid derivative, usually containing four iodine atoms. Like cholesterol, this simple molecule does not vary among vertebrate species. It is extracted from sheep, cattle, and pigs, rather than from some other vertebrate, simply because slaughter houses have a cheap, plentiful supply. Human or ape thyroxin would be no better and is not available in quantity.

As for the Abrams Dynamizer "proof," the reader is referred to the preceding discussion of blood protein structural data. Humans and chimpanzees have *identical or nearly identical* hemoglobins, *A*, *O*, and *Rh* antigens, lysozymes, albumins, and many other blood molecules. These same blood proteins are very similar in cattle and sheep, but differ from human and chimpanzee proteins by many amino acids. For example, Morris Goodman showed that human and sheep alpha hemoglobin differ by twenty-three of 143 amino acids (In G. Fasman, *Proteins*, Vol. 3 of *Handbook of Biochemistry and Molecular Biology*, Third Edition, Chemical Rubber Company, 1976, pp. 441-447).

The entire *disproof* is nothing more than a baseless pseudoscientific fantasy that preys upon the scientific credulity of its intended audience. Blaise Pascal (1623-1662) summed up the ethics of the purveyors of this nonsense when he wrote: "Men never do evil so cheerfully and so completely as when they do so from religious conviction."

We have just examined several typical examples of "scientific facts that fit the creation model better than they fit the theory of evolution." If the creationists had any real data that supported their claims, why would they publish such patent nonsense?

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Scientific Creationism and the Science of Creative Intelligence

Robert M. Price

As is well known, proponents of creationism loudly contend that their doctrine is purely scientific, not religious, and therefore nothing should stand in the way of its being included in public school science curricula. This claim naturally presents us with a tangle of several legal issues, not the least of which is the danger of mandating by law that *any* specific view be taught. One thinks immediately of the canonization of Lysenko in the Soviet Union, and one can well imagine what would happen if racist fanatics succeeded in having the views of Shockley or Jenson forcibly included in genetics courses. Creationists, it seems, are oblivious to such dangers—or at least we may be charitable enough to suppose so.

But an issue that is in some ways more interesting is that of church-state separation. Would the mandated teaching of creationism constitute the promotion of a religious doctrine by the government, something forbidden by the U.S. Constitution? Yes, it would. And this may be seen most clearly by comparing "scientific creationism" to the Marharishi Mahesh Yogi's transcendental meditation. The latter was briefly offered for credit in public high schools until fundamentalist Christians blew the whistle on the religious nature of this supposed "*science* of creative intelligence." The parallels between scientific creationism and the science of creative intelligence are both surprising and revealing and therefore will be explored in detail in this article.

From Religion to Science

Maharishi ("Great Seer") Mahesh Yogi, an Indian guru in the Vedanta tradition, set out in 1959 to bring a simplified version of "transcendental deep mediation" to the samsara-soaked West. The origins of the practice were clearly in the monistic Hinduism of Shankara, wherein the goal of religion—of human existence itself—is to pass beyond the illusion (*maya*) of diversity and so to realize one's identity with *Brahman*, the impersonal absolute, conceived as the eternal essence preceding all existence. This fact is nowhere more clearly seen than in the

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Maharishi's own commentary on the first six chapters of the Bhagavad Gita, the key text of Vedanta Hinduism. When the guru founded an organization to spread his faith in America, there was no doubt as to its religious nature. It was called the Spiritual Regeneration Movement Foundation. A certificate of incorporation, written in 1961, made no bones about the fact that "this corporation is a religious one" (article eleven).

During the years 1967 and 1968, Maharishi and his lieutenants reluctantly decided that their movement had met with little success. Few Americans had seen the light. So a change in tactics was deemed necessary. Given the American people's infatuation with science and the American government's disinclination to abet religious propaganda, the course of action seemed clear. Transcendental meditation would die as a religion and rise again (or be "reincarnated") as a science.

In actuality, no substantial change was envisioned. For Krishna characterizes reincarnation in the Bhagavad Gita, "As leaving aside worn-out garments/A man [merely] takes other, new ones" (II:22). Maharishi's rationale was that, if one were going to cast his pearls before swine, he ought to disguise the pearls as something the swine could appreciate. "Not in the name of God-realization can we call a man to meditate in the world today, but in the name of enjoying the world better, sleeping well at night, being wide awake during the day" (Maharishi, *Meditations of the Maharishi Mahesh Yogi*, p. 168, and in Bjornstad, p. 22). Isn't this a little dishonest? Rest easy, it is only a bit of "heavenly deception." In his commentary on the Gita, Maharishi explained that, "if the enlightened man wants to bless one who is ignorant, he should meet him on the level of his ignorance and try to lift him up from there by giving him the key to transcending [it], so that he may gain bliss-consciousness and experience the Reality of life. He should not tell him about the level of the realized, because it would only confuse him" (Maharishi as quoted in Patton, p. 55). Theory became practice. Vail Hamilton, a former TM instructor, recalls the organization's strategy:

> An ordinary person, doing an eight-to-five job, who never thought about anything of a philosophical or religious nature, might be put off by hearing about higher states of consciousness, like God-consciousness, but he would understand it at the level of relaxing, getting rid of the cigarette habit, things like that. So then, you get a person into it then, so that their stress can start getting released, and then, eventually, they will be able to accept the idea of going on to higher states. ("TM Behind Close Doors," *Right On*, November 1975, p. 12).

But, as already anticipated, a new flavor was not all the guru wanted for his product. New marketing methods were sought as well: "It seems for the present, that this transcendental deep meditation should be made available to the peoples through the agencies of government. It is not the time when any effort to

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perpetuate a new and useful ideology without the help of governments can succeed" (Maharishi Mahesh Yogi, *Transcendental Mediation*, p. 300, and in Patton, p. 54). Transcendental Meditation got that help in 1975 when it was offered for credit in the public school systems of Dade County, Florida, Louisville, Kentucky, Eastchester, New York, Hartford, Connecticut, San Lorenzo, California, and Essex County, New Jersey. By this time, a new charter had eliminated references to the organization's religious aims, and the name was changed to the "World Plan Executive Council."

About the same time, Christian creationists opposing evolution changed their tactics in an analogous manner. The turning point seems to have been a 1975 decision by the Sixth Circuit Court of Appeals, declaring unconstitutional a Tennessee law mandating that textbooks include the discussion of Genesis alongside evolution. To require a discussion of the Bible in this way was seen as tantamount to state promotion of religion. Henceforth, fundamentalists sought "equal time" not for *religious* but for *scientific* creationism. Creationist leader Henry M. Morris reveals the logic underlying this cosmetic change in terms paralleling point-for-point those of Maharishi Mahesh Yogi: "The Bible account of creation can be taught in the public schools only if the scientific aspects of creationism are taught, keeping the Bible and religion out of it altogether" (Morris, p. 4). Morris, like Maharishi, covets the aid of the government, for he envisions "political or legislative efforts to require creationist teaching . . ." (p. 1). So, in both the case of TM and fundamentalism, we have witnessed a surface metamorphosis of avowed religion into alleged science. The first became the "science of creative intelligence"; while the second took the alias of "scientific creationism." Of the first Maharishi claims, "It is not religious"; of the second, Morris contends, "Creation is just as much a science as is evolution."

Deus Absconditus

How did each group try to support its claim to be purely scientific and not religious? First, there were attempts to provide scientific documentation for each belief system. TM cited various studies tending to confirm that meditators experienced reduced breath rates, a decrease in blood lactate, and increased alpha and beta brain waves. However, such claims were problematical. For one thing, they could never lend credence to the basic claim that in the meditative state one made contact with the "field of creative intelligence," since this field allegedly underlies all particularized existence and therefore by definition could never be tested. So the verifiable part was, at most, the relaxation technique. On one level this very fact might be seen as vindicating the claim that TM was a simple technique and not a religion. Yet the fact remained that TM was never offered without indoctrination into the metaphysics of "creative intelligence" or participation in a

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Sanskrit ritual invoking various gods and devas. So some tests might indicate at least that the relaxation technique of TM produces concrete results. "But the beneficial changes attributed to TM are not universally accepted by scientists. Some researchers have been unable to replicate certain findings, while others argue over the interpretation of results" (Montgomery, p. 64). In particular, the studies were flawed by the possibility of self-fulfilling prophecy—or the placebo effect. Neurophysiologist Peter Fenwick warns: "All these studies need to be looked upon with reservations. Few include adequate control groups, and none that I am aware of have yet used a blind control procedure where neither subject nor observor is aware of the treatment given or the aims of the experiment" (Fenwick as quoted in Haddon, p. 7). Such "blind control procedures" were especially unlikely since many or most of these experiments were conducted by the TM organization or by meditators. This is rather like the American Tobacco Industry producing statistics about the safety of smoking. In neither case could the results be dismissed out of hand, but we are entitled to be on our guard.

We are no less suspicious of some of the scientific documentation offered by creationists. The evidence will be naturally of a different kind, creation not being a repeatable process. Most often creationists appeal to fossils and the like. Both their investigative procedures and their interpretations are questionable. Michigan State's Donald Weinshank checked into several field research projects conducted by the Institute for Creation Research and announced that "not one of these came even close to observing the accepted standards of the scientific method" (Weinshank as quoted in Zuidema, p. 5). Also troubling is the propensity of creationists to make a great deal of soon-discredited "freak phenomena"—a la Erich von Daniken. For instance, creationists pointed with glee to a set of human footprints (from their size, apparently belonging to the Incredible Hulk) found beside dinosaur tracks in the Paluxy River Basin in Texas. Kelly Segraves, instigator of a recent California anti-evolution suit, contended that this find must compel scientists to revise completely their views as to the order of the appearance of life (Segraves, p. 17). Instead, perhaps Segraves will be compelled to revise his propaganda in light of the recent admission by area residents that the humanoid prints were chiseled beside genuine fossils as a tourist attraction (Zuidema, p. 5).

Besides the adducing of questionable evidence, both the science of creative intelligence and scientific creationism seek to reinforce their scientific, even secular, status by the manipulation of language. Both have issued textbooks which outline clearly religious belief systems, yet hope to hide their religious nature by substituting various nomenclature for "God." The TM textbook used in public schools described the "field of creative intelligence" as being omnipresent, as being the source and goal of all existence, the guide and sustainer of the universe, pure love, truth, and justice, unlimited in power, the source of being, and so on. Instead of "God" or "brahman," of which the preceding are all unmistakably divine attributes, the textbook makes them mere "qualities" of "crea-

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tive intelligence." Yet even this apparently innocuous jargon is a Vedic designation of God. He is "the impulse of creative intelligence responsible for the whole manifest universe" (*Rig-Veda* I.164.39 in Patton, p. 53).

The same sort of sleight-of-hand is present in both the standard and public school editions of the creationist textbooks written by Henry Morris and Duane T. Gish. The latter edition removes some overtly religious references and omits *God* in favor of generic terms such as *designer. Divine creation* may become *special creation.* One can almost hear the biblical cock crowing in the background. In short, it would seem that both movements, in order to gain access to public schools for propaganda purposes, sought to disguise their religious nature using the strategy of "covering their tracks." The meditator or the creationist presents his belief system, whereupon the observer responds, "Say, wait a minute. This is religion!" The other merely replies, "Oh, no it's not. We'd never try that! Rest assured, this is science." The hope is that the skeptic will be satisfied that his fears have been allayed and that he will go on to accept what is offered, ignoring the taste because the label has been changed.

The Legal Precedent

In the case of the science of creative intelligence, the ploy did not finally succeed. When fundamentalists protested what amounted to the teaching of Hinduism in the public schools, the court examined TM's claims not to be religious and found them wanting. While this could mean intentional subterfuge on the part of the Maharishi's organization, the New Jersey Supreme Court found no need to make such an implication. But it did claim to know better than the meditators themselves whether or not their practice was in fact religious. For no matter how sincere the meditators' conviction in this regard, the Court ruled that the facts spoke for themselves.

In so ruling, Judge Meanor appealed to the 1970 decision, *Welsh* vs. *United States*, 398 U.S. 333. This case involved the 1965 decision in *United States* vs. *Seeger*, 380 U.S. 163, in which Seeger claimed conscientious objector status on the grounds that, though his moral opposition to war did not entail theistic beliefs, he felt that his convictions were nevertheless religious in nature. The court agreed, ruling that the legal definition of religion need not involve theism. In 1970 Welsh contended for conscientious objector status on the basis of moral beliefs similar to Seeger's, yet he denied that they were religious beliefs. Could not other heartfelt convictions besides religious faith entitle one to exemption? The court ruled that Welsh's beliefs were in fact religious in the eyes of the state, despite Welsh's own subjective evaluation of them as nonreligious. Similarly, Judge Meanor decided that the belief by meditators that TM was secular does not make it nonreligious. The science of creative intelligence is not considered secular sci-

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ence by the courts, and it is no longer taught in the public schools.

The relevance of the precedent thus established is obvious. No matter how strenuously and sincerely scientific creationists maintain the nonreligious character of their "model," the facts speak for themselves. And, on the analogy with Judge Meanor's decision, it is the facts and not their subjective evaluation by the creationists themselves that must finally decide the issue. The teaching of creationism in public schools would constitute a violation of the U.S. Constitution as the promotion of religion under government auspices. We may hope that fundamentalists who have demonstrated their zeal for church-state separation in the case of TM will continue to see the wisdom of such separation in the case of creationism. Granted, faithfulness to our common American heritage will seem more costly in this case, since it is their own belief that is concerned, but freedom of religion in America has always depended on exchanging privilege for one's own sect for the security of never being disadvantaged in favor of someone else's.

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Creationism and the First Amendment

Delos B. McKown

In an enlightening but disturbing article, entitled "Freedom of Religion and Science Instruction in Public Schools" (*Yale Law Journal*, January 1978, 87:3:515–570), attorney Wendell R. Bird lays the constitutional foundation for demanding equal time in the public schools for "scientific creationism." Because this article is referred to so frequently by creationists, it will be necessary to analyze its main arguments in detail. Another article by Bird, this one a short popular piece entitled "Evolution in Public Schools and Creation in Students' Homes: What Creationists Can Do" (*ICR Impact Series*, March 1979, 69:i–iv), provides additional material on the same subject and is thus useful for interpreting the former. For thoroughness in analyzing Bird's constitutional arguments, these two articles will both be used, referred to respectively as the Y-article (Yale) and the I-article (ICR), followed by page and footnote numbers.

"A controversy is raging over public school instruction in the origin of the universe and life," says the opening sentence of Bird's Y-article (p. 515). The crux of this controversy is the general theory of evolution. Why, Bird agonizes, is this theory taught in the public schools as the only scientific approach to origins (I-article, p. i)? Dismissing the fact that (at present, at least) there is no scientific alternative to it, scientific creationists, hoping to rectify what to them is a deplorable situation, have rolled out the two biblical creation stories, dolled them up in scientific jargon, and offered them to the public as though they were one, rather than two, and scientific throughout.

The problem for Bird and his cohorts is how to get this model of divine creation accepted as a legitimate scientific theory on a par with the general theory of evolution. There is always the danger for them that some educators, courts, and enlightened citizens will detect old-fashioned biblical creationism behind the garb of scientific creationism—much as the little boy of legend saw the naked emperor behind his nonexistent finery. Since teaching biblical creationism in its unclothed form, so to speak, violates the First Amendment, as Bird points out (Y-article, p. 553), it is necessary for scientific creationists to resort to various strategems. The first and most significant of these is Bird's charge that "exclusive public school instruction in the general theory of evolution, at the secondary and elementary

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levels, abridges free exercise of religion'' (Y-article, p. 518). Second is the strenuous, if not frantic, attempt to recast biblical creationism as scientific in the hope that it will then be acceptable in public education. And third is the effort to prove that the general theory of evolution is somehow an article of faith, thus rendering it religious and on a par with creationism.

The Free Exercise Argument

Bird contends that exclusive public school instruction in the general theory of evolution abridges the free exercise of religion, because that practice, to him, elevates what is a mere theory to the level of fact. The ''indoctrination'' of creationist students, which results from the exclusive presentation of this theory, is supposedly unconstitutional because the Supreme Court has ruled that the public schools may neither undercut religious convictions nor violate religious practices—such as the practices of some sects requiring their children to avoid as much as possible exposure to worldly affairs (I-article, p. ii). From the same text Bird refers to such separatist practices as avoiding fellowship with the ''unfruitful works of darkness.'' Moreover, the public schools may not compel students to make unconscionable declarations of belief (Y-article, pp. 526, 528, fn. 49). It is illegal, in his view, to ask creationist students any question that would require an evolutionist answer, for that would be a species of corrupt communication (hence, unconscionable), all forms of which are expressly forbidden to Christians (Ephesians 4:29).

Since the public schools are coercive through attendance requirements and prescribed curricula and since teacher influence and peer pressure promote conformity with whatever is being taught as fact, such as evolution, one possible constitutional remedy to this burden on the religious rights of creationists would be to give equal time to one or more alternative points of view. This, argues Bird, would prevent indoctrination in any one position. And since the courts have already ruled, according to Bird (Y-article, p. 563), that it would be unreasonable to give equal time to *all* religious theories of origins, public school teachers would not have to master the many mythological accounts of creation. It would suffice if they were to master only one: the alternative view known as scientific creationism, a scientific model fully on a par with evolution and a benefit to no particular religion.

Suppose, however, that the schools, courts, and a majority of the parents of public school children were not to agree that scientific creationism is scientific or on a par with evolution and that they were to recognize its clear benefits to the literalist, fundamentalist, evangelical wing of Christianity? What then? Bird points out that the Constitution does not require states to provide public schools (Y-article, pp. 565–566, fn. 262). Furthermore, states have the authority to abol-

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ish instruction in a topic or a discipline in public school curricula. If instruction in origins were to become too expensive due to litigation or too divisive in the communities of a state to make it worth retaining, such instruction could simply be eliminated.

This means that the simplest way to remove the burden on free exercise of religion is to remove all teaching related to the origins of the universe and life. Bird maintains that the state has no compelling interest in having the public schools teach anything in this area. The state's compelling interests lie, rather, in producing future citizens who will be literate and knowledgeable of the history and civics of their country. Even granting that the state has some interests in acquainting students with certain elements of science, there is little or no reason why information on origins should be included.

In public utterances and in print, scientific creationists usually pose as people who are asking for no more than equal time in the public schools for what they believe is the scientific alternative to the general theory of evolution (Y-article, p. 517). In private, however, it seems clear that they would like to drive the general theory of evolution from the classroom altogether and have only creationism taught. If they cannot accomplish the latter, they will accept the former. If they cannot accomplish the former, it seems reasonable that they will do whatever they can to have the threat implicit in Bird's Y-article carried out. That is, their cause would be well served by getting as many states as they could to eliminate all instruction in scientific theories concerning the origin and development of the universe, earth, and life. If science instruction should be gutted in the process, so be it!

The error in Bird's reasoning seems to be his view that the exclusive teaching of evolution is a threat to the religious rights of creationists. At least two recent court decisions counter this argument. In *Crowley* vs. *Smithsonian Institution*, the U.S. District Court of Washington, D.C., ruled that creationists' free exercise of religion was not impaired simply because they might happen upon a public museum exhibit on evolution that was distasteful to their faith. In *Segraves* vs. *California*, the Sacramento County Superior Court ruled that the state's guidelines on the exclusive teaching of evolution in the public schools did not represent such a burden.

Bird, of course, disagrees. He cites *McCollum* vs. *Board of Education* as though it applies in the case of creationists. But the *McCollum* decision ruled against sectarian religion in the public schools. Such religious instruction is not only a burden on the free exercise rights of nonreligious children but is an unconstitutional breech of the wall of separation between church and state—even if there are no students or parents who complain. The remedy in such a case is always to remove the instruction. But in the case of instruction of evolution, there is no presentation of sectarian religion. There is simply a situation where a student's beliefs clash with particular nonreligious subject matter. Without student

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complaint, no problem would exist. So in these cases, the solution is always to remove the student (in a manner that would spare the child from derision by his or her peers). This is sometimes how matters are handled when parents object to sex education.

But even if these court rulings had supported Bird's reasoning, there is a more practical remedy than Bird's choice of either equal time for creationism or removal of all instruction inorigins. Interestingly enough, Bird suggests this remedy himself. Since elimination of origins from the curriculum "would obstruct the state concern in presentation of the general theory," then interference of this type "might be minimized by elimination of instruction in a particular topic, the general theory, in only an alternate class. Another existing biology class might continue presentation of the general theory" (Y-article, p. 577, fn. 277). Each year a different biology teacher could be set aside to teach a biology class denuded of all references to origins. This would be for conscientious objectors and would involve neither creation nor evolution. No one but the teacher and the objecting students would need to know about it, thus eliminating the risk of peer pressure. It is not surprising that Bird would relegate this idea to a mere footnote at the end of his Y-article and never mention it again. His purpose is to promote creationism or ban evolution in the public schools. This footnoted alternative would do neither and therefore is probably not to his liking.

The Creationism Is Science Argument

The second strategem of Bird and other creationists is the attempt (really a propaganda blitz) to convince all and sundry that there is a creationist model of origins on a par with the general theory of evolution—namely, scientific creationism. Bird agrees wholeheartedly that to teach biblical creationism in the public schools would surely violate the establishment clause of the First Amendment (Y-article, p. 553). But, he continues to say that instruction in scientific creationism avoids this prohibition (pp. 554–555). If the scientific version happens to conform with the religious version, this is merely a coincidence.

This "coincidence" calls for careful scrutiny. Bird lists six points that constitute the model of scientific creationism, each of which is quoted and analyzed below (Y-article, p. 554).

First is the "special creation of matter and life." Creationists cannot abide the idea that what we commonly call "matter-energy" names The Given—that is, the ultimate that can only be accepted on its own terms and remains to be explained and understood on those same terms insofar as is humanly possible. Scientific creationists try to transcend matter-energy by positing its creator. For such folk, the creator then becomes The Given, The Underived One, the same yesterday, today, and forever.

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But even if there were a given of this latter sort, what, we must ask, are the compelling reasons for believing that the biblical God resembles it? After all, the world has known many gods, not a few of whom have been creators in one way or another. Merely to say that matter-energy and life have been created is not to specify how or by which divine agency. David Hume, the Scottish philosopher, once observed that for all we can know this world may be "only the first rude essay of some infant deity who afterwards abandoned it, ashamed of his lame performance," or, perhaps, the work of some "dependent, inferior deity" whose handiwork is the "object of derision to his superiors" or, finally, the product of the "old age and dotage in some superannuated deity," an artifact that "ever since his death has run on at adventures from that first impulse and active force which it received from him." Bird, however leaves no doubt as to which deity he has in mind (I-article, pp. i–ii). That he has committed the fallacy of assuming the creator of matter-energy and the biblical God to be one and the same seems to have escaped him.

Second is the "stability of original plant and animal kinds." In Genesis the various kinds of plants and animals are commanded to bring forth after their own kind (1:11–12, 21, 24–25). Just why descent with modification (evolution) after an initial creation should be objectionable to a creator-deity is never made clear. Why, for example, would a world whose life forms evolve toward greater order and complexity not be as excellent as a world whose species were fixed? It is obviously not just any creator of matter-energy and life but the biblical God whose wishes in the matter are at issue.

Third is the denial of any "common ancestry of human beings with apes." Bird is right in thinking that neither of the Genesis accounts of human creation (1:27 and 2:7, 22) announces that Adam and the apes came from a common rib, so to speak. But then again, Genesis never mentions the *existence* of apes. Why so important a classification of animals as the primates is excluded from specific mention is curious, especially in view of the astonishing similarities in blood proteins between humans on the one hand and chimpanzees and gorillas on the other.

Fourth, scientific creationism "offers catastrophism." What a strange locution! Why not simply say that the evidence leads scientific creationists to hypothesize that physical processes occurring now may not always have occurred at the same rates during all past epochs? That would serve to distinguish uniformitarianism (the belief that processes similar to those occurring now occurred at similar rates in the past) from catastrophism (the belief that some processes have been subjected to radical alteration in rate on one or more prior occasion). The solution to the strange locution is best left until the sixth point is discussed.

Fifth, scientific creationism "suggests that the law of entropy, or change toward disorder, applies to the earth and living organisms." Granted, but *applies* is a very weak term—one too weak to permit Bird to propose that entropy

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prevents the evolution of life from nonliving molecules and of complex forms of life from simpler ones (I-article, pp. ii–iii). Entropy would hold no theological charm for scientific creationists if it could not be trundled out conveniently to render evolution impossible. But does it? All thermodynamicists (excepting committed Christians or related fundamentalists) who believe that the second law of thermodynamics prevents organic evolution would do us a great favor if they would identify themselves and give their reasons for so believing. We should not expect a stampede; no, a corporal's guard would be more like it, for there is nothing inconsistent between entropy as a fact about the universe taken as a whole and the evolution of life at specific places in the universe, such as on earth, at least for limited periods of time. Scientific creationists do not merely grasp at entropy as a drowning person grasps at the proverbial straw, some at least believe the second law to be revealed, even if darkly, in Genesis 3:17, which says, "cursed shall be the ground because of you"—that is, because of Adam and Eve for their indulgence in forbidden fruit. The precise consequences of this curse are spelled out in the verses of Genesis immediately following and have nothing whatsoever to do with thermodynamics.

Sixth is the contention that the "world and life came into existence relatively recently," by which scientific creationists mean not more than about ten thousand years ago. But why recently? There is nothing about the special creation of matter-energy or about the special creation of life by some divine agency that requires either recent or close dating. The recent date is a requirement of biblical literalism, of good old-fashioned fundamentalism. Furthermore, nothing in modern science necessitates or suggests that the universe, the earth, and life on earth all originated no more than about ten thousand years ago and within a few days of each other. It is dating internal to the Bible in general and to the first chapters of Genesis in particular that require the recent date mentioned above. In short, scientific creationists have not been led to the idea of a recent creation by evidence scientifically garnered but by faith alone. In fact, in order to bolster their young universe claims, scientific creationists have wheeled out the Noachian flood (Genesis 6:8–9:17) in an attempt to falsify the large body of evidence supporting dates of origin immensely more remote than anything suitable for Genesis.

The geological evidence for a planetary flood of water twenty-two feet above the highest mountain, lasting up to a year (Genesis suggests two different time spans) and occurring less than ten thousand years ago is, at best, scanty in the annals of science. Unabashed by this lack of historicity, scientific creationists proceed to out-do even the most fanciful of ancient mythmakers by claiming that the Noachian flood was a catastrophe of such planetary magnitude as to render uniformitarianism invalid when applied to processes occurring prior to the deluge and to falsify the dating of any events that occurred earlier than ten thousand years ago. Just how the flood invalidates dates of cosmic events that are based on

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studies of the red shift in stellar spectra is unclear, but it or something equally catastrophic must have, because, according to a literal reading of Genesis, the earth was created prior to the sun and other stellar bodies.

One can see now why Bird said earlier that scientific creationism "offers catastrophism." Indeed, it is so scientifically hard-up that it has to offer the catastrophe of a nonexistent event in the hope of nullifying any and all assumptions and techniques leading to belief in planetary and cosmic events occurring millions and billions of years ago. Since a literal reading of Genesis requires that creation be recent, the true believer must offer anything, even a modified Mesopotamian flood story, in order to make it so and must grasp at any straw, even the weak reed of entropy, in attempting to render evolution impossible.

Among the various kinds of fraud, pious fraud looms large and occurs with distressing frequency. A prime example is the creationist contention that the model of scientific creationism is based on scientific inquiry (rather than on faith in revelation) and only *coincidentally* conforms with biblical creationism. It is a fraud because four of the six points in the model of scientific creationism are biblically dependent rather than scientifically supported, and the remaining two are related to biblical texts covertly. The "special creation of matter and life," although seemingly deistic or religiously neutral, is actually biblical. Which god Bird has in mind is made clear by the fact that he continually argues that over "fourteen million individuals in the nation are adherents of religions that explicitly teach special creation" and that this is a major argument for equal time (Y-article, p. 550). "The stability of original plant and animal kinds" is biblical as is the denial of any "common ancestry of human beings with apes." Neither would be necessary in a merely monotheistic or religiously neutral creation science. Noah's flood is biblical and was certainly a catastrophe within the confines of the story, although hardly a catastrophe of the magnitude claimed for it by scientific creationists. In this respect our modern myth makers far exceed their ancient progenitors. Entropy, though not specifically biblical, can still be justified by reinterpreting the "curse" in Genesis 3:17 (not to mention Psalms 102:25–26; Matthew 24:35; Romans 8:22). And also the notion that the "world and life came into existence relatively recently" is biblical.

If, as Bird has admitted, the teaching of "biblical creationism would contravene the establishment clause" of the First Amendment (Y-article, pp. 553–554), then so too would scientific creationism, the two being practically the same.

The Evolution Is Humanism Argument

The third strategem consists in trying to transmute the general theory of evolution into an article of faith, thus rendering it religious. In his Y-article, Bird disavows any intention of considering whether or not "unneutral instruction in the general

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theory of evolution is an establishment of religion" and thus a violation of the First Amendment (p. 518, fn. 15). Nevertheless, he cannot resist quoting Dr. Henry M. Morris, whom he calls the "foremost advocate" of scientific creationism (p. 515, fn. 12): "Creation is as scientific as evolution and . . . evolution is as religious as creation" (p. 557, fn. 209). Nor can he resist quoting these ringing words again in his I-article (p. iii). What now remains at issue is the contention that evolution is as religious as creation.

"Much support for the general theory is religious," Bird claims. "The late Sir Julian Huxley provides a prominent example in his advocacy of the 'religion of evolutionary humanism, and the 'religious humanism' movement provides another" (Y-article, p. 517, fn. 14). In the same vein, he writes, "The renowned *Humanist Manifesto* . . . stressed the general theory of evolution. . . . *Humanist Manifesto II* also emphasized [it]." Finally, noting that there is a group called the Fellowship of Religious Humanists, he discerns "a definite conjunction of the general theory with religious Humanism" (Y-article, p. 556, fn. 206). Since Bird also states categorically that the general theory of evolution is "neither a religious doctrine nor religious Humanism" (Y-article, p. 558, fn. 212; p. 564), why then these irrelevant remarks first giving the eminent Dr. Morris's opinion that evolution is as religious as creationism and then contradicting him?

Perhaps he wishes to hint at the notion but not put himself on the line about it. After all, the mere acceptance of a scientific theory by a religious group does not magically make such a theory religious. That would be like saying that, because most Christians believe in gravity, gravity is religious and not scientific. This point is too obvious for Bird to forthrightly oppose.

But whether or not the general theory of evolution is unscientific (as creationists maintain), one thing is clear: scientific creationism is unscientific, being nothing but badly disguised biblical creationism, albeit embellished with a few scientific terms. In order to strengthen their very weak case for equal time in the public schools, tarring the opposition with the same brush helps the scientific creationists. Dr. Duane T. Gish, associate director of the Institute for Creation Research and professor of natural science at Christian Heritage College, makes this crystal clear. In *Evolution: The Fossils Say No!*, he refers to such men as Julian Huxley, George Gaylord Simpson, and Jacques Monod, saying, "They have then combined this evolution theory with humanistic philosophy and have clothed the whole with the term *science.* The product, a nontheistic religion, with evolutionary philosophy as its creed under the guise of *science*, is being taught in most public schools, colleges, and universities of the United States. It has become our unofficial, state-sanctioned religion" (p. 12). Although Attorney Bird is not above committing elementary fallacies on behalf of scientific creationism, when writing in the *Yale Law Journal*, he is too discreet to state the case as baldly as does Dr. Gish. Since scientific creationism cannot pass muster as scientific (at least, among informed people), what more effective ploy is thee than to brand

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the opposition as equally religious? Then the conflict between creationism and evolution can be seen as the scientific creationist would have it: a conflict between the false religion of godless humanism and his own true religion—not a conflict between science and religion, if by the former is meant the discoveries of the free, open, and critical mind and by the latter any cult to which scriptual literalism (or other inherently anti-scientific commitment) is crucial).

The First Amendment and Science

The threats which scientific creationists pose are not unique. Other religious interests pose similar threats in principle at least and, in Constitutional terms, pose them legitimately. The First Amendment says in part, "Congress shall make no law respecting an establishment of religion, nor prohibiting the free exercise thereof. . . ." The Supreme Court has interpreted this (suitably augmented by the Fourteenth Amendment) to mean that government at every level must be neutral respecting religion. Thus, government may not favor any religious position or party over another nor be hostile to any in any way. On the contrary, it must be respectful of all beliefs taken and held sincerely by individuals to be religious. Furthermore, since a citizen has the right not to affirm a doctrine offensive to his religion, it follows that the government may not force a profession of belief or of disbelief in any religious doctrine or creed. Although ours is a theistic heritage, deeply embedded in the Judeo-Christian tradition, the framers of the Constitution and its offical interpreters have not defined religion in theistic terms alone but have conceived of it so broadly as to include nontheistic religions and even atheistic philosophies of life that function in the adherent's life as does religion in the theist's life. Moreover, government may not establish tests for the veracity, the rationality, or the relative importance, theologically speaking, of any given belief taken to be religious. In short, even though religious practices may sometimes be curtailed, religious beliefs, of whatever kind, are inviolable precisely because they are religious.

So far, so good. The First Amendment represents a gigantic step forward in church-state relationships. Nevertheless, within its freedoms and protections grow the roots of the conflict now burgeoning between science and science education on the one hand and fundamentalist religion on the other. Although the scientific outlook may prevail in the long run, it is sobering to note that, as of now, any religion, no matter how absurd or benighted, enjoys greater constitutional protection than does any science—or aspect thereof—no matter how sober or well confirmed. To put it even more bluntly, any religious mythology or superstition is more secure legally than is the academic integrity of science, particularly in primary and secondary schools. If nothing else, Bird's articles provide a service by making this fact abundantly clear.

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Victory in Arkansas: The Trial, Decision, and Aftermath

Frederick Edwords

December 7, 1981, the fortieth anniversary of the bombing of Pearl Harbor, will be remembered by veterans of a different conflict as the first day of the Arkansas court case dubbed "Scopes II." Arkansas had earlier in the year passed a two-model creation-evolution bill that demanded equal time for "creation science" every time evolution was taught. The American Civil Liberties Union filed suit in federal court charging that the law was unconstitutional and therefore should be struck down. After six months of preparation, which included the ACLU's unsuccessful efforts to subpoena a major portion of the files of the Institute for Creation Research, the two sides in the case met in the Little Rock courtroom before U.S. District Judge William Overton.

The Trial

It was clear from the beginning that the case would be a major battle of immense interest to the public. In the courtroom itself were nine trial lawyers, seven television crews, and an audience of two hundred reporters and spectators. A man in a gorilla suit, carrying a sign bearing a question mark, strolled through the court building. Evening newspapers around the country reported each day's events the day they happened. Even newspapers in foreign countries, including those as far away as Australia, ran full daily reports.

According to the ACLU challenge, the creation law (Act 590) constituted an establishment of religion—which is prohibited by the First Amendment of the Constitution—violated the academic freedom of teachers and students, and was impermissibly vague in its wording. The ACLU's strategy was to prove that the law resulted in unconstitutional establishment of religion by referring to the case of *Lemon* vs. *Kurtzman*, in which the Establishment Clause test was clearly formulated, and by demonstrating how Act 590 failed to meet the requirements of a constitutional law in this regard. The requirements are as follows: "First, the statute must have a secular legislative purpose; second, its principal or primary effect must be one that neither advances nor inhibits religion . . . finally, the

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statute must not foster an excessive government entanglement with religion." Failure to meet any of these criteria would render the law unconstitutional.

The opening arguments of the ACLU were presented by attorney Robert Cearley. He argued that the creationism law was an "unprecedented attempt by the legislature to use its power and authority to define what science is and to force religion into the schools in the guise of science." Arkansas Attorney-General Steve Clark, speaking in defense of the law, argued that the statute only "broadens the teaching of origins from a one-model to a two-model approach." He further stated that it was a "mere coincidence" that the law's definition of "creation science" resembled certain religious beliefs.

Since Judge Overton decided to allow both sides to put all testimony they wished on the court record before he decided what to rule out, the Arkansas case (*McLean* vs. *Arkansas*) immediately moved ahead of the historic *Scopes* and *Epperson* trials which had evaded the direct battle over evidence for creation and evolution.

The first witnesses for the plaintiffs challenging the law were several Bible scholars who testified that some of the language of Act 590 came directly from the book of Genesis, including the word *kinds*, a creationist term for animal groups that is found mainly in the King James translation. Michael Ruse, a professor of philosophy at the University of Guelph in Ontario, Canada, argued that creationists abandon the scientific approach when they invoke miracles to patch up difficulties in their theory. He characterized creationist methods as being "rather sleazy."

Dorothy Nelkin of Cornell University and George Marsden of Calvin College in Grand Rapids, Michigan, testified on the history of the fundamentalist and creationist movements in the United States. Nelkin said that she had discovered, during research for her book on the subject, that fundamentalists equate evolution with "communism, sexual promiscuity, the decline of the family, and streaking." Marsden quoted creationist Henry Morris as saying that evolution "is really the foundation of the very rebellion of Satan himself." Attorneys for the state objected that this data was irrelevant because the law under question did not involve the teaching of religion. However, Judge Overton overruled them, declaring that creationist authors "can't wear two hats. I don't think the writers can call it religion for one purpose and science for another."

Geneticist Francisco Ayala, who has been an editor of journals concerning genetics and who has reviewed papers for many others, noted in his testimony that he had never heard of a scientific paper on creationism being submitted to any scientific journal. This indicated that creationists were bypassing the scientific community and were instead using political means to establish their "science" in the schools. Ayala noted that something similar had happened a number of years ago in the Soviet Union when doctrinaire proponents of Lamarckian evolution demanded equal time with Darwinism. Because they used

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political means, the Lamarckian advocates managed to finally push Darwinism out, and Soviet biology suffered a thirty-year setback as a result of state attachment to this pseudoscientific position.

Ayala also presented some of the genetic evidence for evolution. He noted that, when geneticists first began to compare genes between humans and apes, the first gene tested showed no difference at all. Comparisons of the second and third genes tested showed no differences either. When the fourth test showed no evidence, the joke began circulating that evolution was false and the only difference between humans and apes was cultural.

G. Brent Dalrymple, of the U.S. Geological Survey, testified that the creationist claim for an earth being no older than twenty thousand years ranks with the "flat earth hypothesis and the hypothesis that the sun goes around the earth."

Stephen Jay Gould read off numerous misquotations, half quotations, and misrepresentations of his own work from the writings of creationist Duane Gish and others. Interestingly enough, Gish was on the scene to witness this expose. Gould further noted that the creationist's arguments for a worldwide flood were shown to be in error as far back as 1831, before Darwin wrote his famous books on evolution.

Dennis Glasgow, the supervisor of science teaching for the Little Rock schools, was the next to testify. He said that, in order to implement Act 590, he would have to uproot the entire school curriculum from kindergarten to senior high. He further argued that the Act, as he understood it, wouldn't allow teachers to voice a professional judgment that creationism was unscientific and that students would be watching the teacher to see if he or she broke the law in the presentation of the material. This would degrade the teacher and cause students to lose respect.

Marianne Wilson, who is in charge of the science curriculum for the largest school district in Arkansas, told the story of her efforts to produue a creation-science curriculum guide. She found all of the standard creationist materials unacceptable because they were permeated with religious references and scientific errors. Ms. Wilson further stated that she was unable to locate the needed scientific materials upon which to base her curriculum guide.

The ACLU rested its case on December 11, and the defense presented its witnesses.

The first defense witness was Professor Norman Geisler of Dallas Theological Seminary. He argued persuasively that the concept of God was not necessarily religious; it only became religious when it involved commitment. He noted that Aristotle had argued for a "first cause" and an "unmoved mover," which Aristotle held to be scientific concepts. Thus, Geisler concluded, mere belief that there is a God "has no religious significance" and therefore could be taught as part of a secular course of study. This was the most crucial testimony for the state's defense.

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But under effective cross-examination from ACLU attorney Anthony Siano, Geisler revealed that he believed the Bible to be inerrant, Satan to be existent, the occult to be real, exorcism to be genuine, and UFOs to be among us. Siano asked his last question, "How are UFOs connected to your religion?" Geisler replied, "I think they are a satanic manifestation in the world for the purpose of deception." For a few seconds the court was silent in astonishment. Then Judge Overton adjourned the session.

Other defense witnesses testified during the following days. Margaret Helder, vice-president of the Creation Research Society and a botanist from Canada, argued that available research didn't support the evolution of plants. But, under cross-examination by Gary Crawford, she admitted that nearly all biologists would disagree with her and that most of her evidence was negative evidence against evolution rather than data supporting creation. She revealed that she believed that there was no scientific evidence supportive of creation.

Dr. Wayne Friar of King's College in New York called Act 590 a "progressive law" at the "cutting edge" of new science and education in America. "If Darwin were alive today, he'd be a creationist," Friar declared.

High school chemistry teacher Jimmy Townley told the court that he wanted to teach a few creationist facts in his classroom, such as the calculation that random combinations of chemicals cannot make the molecules of life. The judge asked him why he couldn't teach that calculation in class now without the creationism law. Townley seemed confused at the idea that opposing information could be part of the study of evoluton. He maintained that any evidence that cast doubt on evolution must be evidence for God and creation. Judge Overton pressed him to think of science as data. After much back and forth, Townley let the cat out of the bag, "I want to teach . . . creation."

Former college chemistry professor Donald Chittick was asked in cross-examination whether or not he would be able to accept any scientific data that contradicted his belief in the literal truth of the Bible. Chittick pondered the question for a full minute before saying softly, "I cannot give an answer. . . ."

Harold Coffin and Ariel Roth, from the Seventh-day Adventist Geoscience Research Institute, the most well-known creationists to testify, presented arguments against evolution. They refered to such things as the apparent rapid fossilization of extinct forms (which they felt would imply a sudden catastrophy, such as a worldwide flood, rather than slow evolution), the great depth of coal beds, the possibility that coral reefs could have grown faster than what evolutionists say, and the fact that the oldest known bat fossil looks very much like a modern bat. But in spite of this seemingly science-based testimony, which the state had hoped would show that creationism was not a religion, Coffin declared under cross-examination that, if it weren't for the Bible, he would believe that the earth was millions of years old. Catastrophic events outlined in the Bible, and nowhere else, coinciding with his scientific studies, convinced him that a world-

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wide flood had occurred about seven thousand years ago.

The most interesting witness for the defense was probably Dr. N. K. Wicramasinghe, head of mathematics and astronomy at the University of Wales and coworker of British astronomer Sir Fred Hoyle. Dr. Wicramasinghe testified that most of the ideas of creation science, such as the young earth, worldwide flood, separate creation of plant and animal "kinds," and the separate ancestry for humans and apes were "claptrap." He only agreed that evolution cannot explain the appearance of life in the first place or the occurrence of new species over time. He argued that the chances that chemical combinations necessary for life could occur from the random motion of molecules were the same as the chances that "a tornado blowing through a junkyard would assemble a Boeing 747."

Wickramasinghe's own scientific hypothesis was that there are microorganisms living inside comets and that life is rained down on earth from space when a comet passes by. He said that one such passage brought life to the earth and that succeeding passages brought the genes that allowed new species to develop. As one example of his evidence, he cited an outbreak of influenza at Eton school in England. When asked if he had "any unequivocal evidence that there is DNA or organisms in space," he answered in the negative. "But you believe that school children caught a cold from a comet?" Wickramasinghe laughed and said, "That is so."

Wickramasinghe also testified that he believed insects might be more intelligent than humans but "they're not letting on that they're smarter, because things are going so well for them."

With such startling testimony and energetic cross-examination, the trial could easily have become a circus. But Judge Overton maintained order in his courtroom, and both sides carefully argued from the law.

The creation had allegedly taken seven days, but its trial took nine.

Judge Overton dispensed with closing arguments from the two sides on December 17, the last day of the trial, and retired with three hundred pages of notes to study in order to arrive at a decision and write an opinion. The written opinion did not emerge until January 5, 1982.

The Decision

In an unusually strongly worded opinion, Judge Overton overturned the Arkansas creationism law and entered an injunction "permanently prohibiting enforcement of Act 590." He declared that the Act failed to meet any one of the three requirements of the Establishment Clause test formulated in *Lemon* vs. *Kurtzman*. In order to show why the Act did not have a secular legislative purpose (the first of the three requirements), Overton detailed the history of the passing of the law, which can be summarized as follows.

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The Arkansas law was a "model" bill drafted and promoted nationwide by Paul Ellwanger, a respiratory therapist from South Carolina. Around 1977, Ellwanger had collected several proposed pieces of creationist legislation with the idea of preparing a model state law. "One of the proposals he collected was prepared by Wendell Bird, who is now a staff attorney for ICR." In explaining his model bill in a letter to Pastor Robert E. Hays, Ellwanger made it clear that he did not believe that creationism was a science.

> While neither evolution nor creation can qualify as a scientific theory, and since it is virtually impossible at this point to educate the whole world that evolution is not a true scientific theory, we have freely used these terms—the evolution theory and the theory of scientific creationism—in the bill's text.

Overton said that Ellwanger's other correspondence on the subject showed "an awareness that Act 590 is a religious crusade, coupled with a desire to conceal this fact." For example, in a letter to Senator Joseph Carlucci of Florida, Ellwanger wrote:

> It would be very wise, if not actually essential, that all of us who are engaged in this legislative effort be careful not to present our position and our work in a religious framework. For example, in written communications that might somehow be shared with those other persons whom we may be trying to convince, it would be well to exclude our own personal testimony or witness for Christ. . . .

In a letter to State Senator Bill Keith of Louisiana, Ellwanger stated, "I view this whole battle as one between God and anti-God forces, though I know there are a large number of evolutionists who believe in God." And, in a letter to Tom Bethell, he revealed his ultimate purpose to be "killing evolution instead of playing these debating games that we've been playing for nigh over a decade already."

The Reverend W. A. Blount, chairman of the Greater Little Rock Evangelical Fellowship in Little Rock, Arkansas, was one of those who received a copy of Ellwanger's model bill. Blout later caused the Evangelical Fellowship to adopt a resolution to seek introduction of the bill in the Arkansas legislature. The proposed bill was then transmitted to Carl A. Hunt, a business associate of State Senator James L. Holsted, with the request that Hunt prevail upon Holsted to introduce it.

Hunt contacted Holsted, and Holsted later introduced the bill in the Arkansas Senate, but "did not consult the State Department of Education, scientists, science educators, or the Arkansas attorney general." No Senate committee held a hearing on the bill, and it was passed after only a few minutes of discussion on the Senate floor. "In the House of Representatives, the bill was referred to the Education Committee, which conducted a perfunctory fifteen-minute hearing.

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No scientist testified at the hearing, nor was any representative from the State Department of Education called to testify."

Interestingly, the legislative "findings of fact" in the model bill were adopted as written, even though "no meaningful fact-finding process was employed by the General Assembly." Ellwanger, Blount, and Holsted were motivated solely by "religious beliefs and the desire to see the biblical version of creation taught in the public schools." Senator Holsted had testified in the case that the bill did indeed favor the religious position of fundamentalist biblical literalists.

Judge Overton added in his opinion that "the state failed to produce any evidence [during the trial] which would warrant an inference or conclusion that at any point in the process anyone considered the legitimate educational value of the Act. It was simply and purely an effort to introduce the biblical version of creation into the public school curricula."

That being established, Overton went on to show that the Act had the principal or primary effect of advancing religion. He did this by showing the clear religious nature of the Act's definition of creation science.

Overton said that this definition "has as its unmentioned reference the first eleven chapters of the Book of Genesis. Among the many creation epics in human history, the account of sudden creation from nothing—or *creatio ex nihilo*—and the subsequent destruction of the world by flood is unique to Genesis." Overton further referred to testimony that showed how this effort to cast Genesis in non-religious terms was discomforting to "some of the Act's theologically sophisticated supporters," who could see that the concept of a creator "distinct from the God of love and mercy is closely similar to the Marcion and Gnostic heresies, among the deadliest to threaten the early Christian church."

The notion of God itself was declared by Overton to be religious. "The argument advanced by defendants' witness, Dr. Norman Geisler, that teaching the existence of God is not religious unless the teaching seeks a commitment, is contrary to common understanding and contradicts settled case law." He cited *Stone* vs. *Graham* and *Abbington School District* vs. *Schempp* in support of this.

The whole approach to teaching creation and evolution under Act 590 "is identical to the two-model approach espoused by the Institute for Creation Research and is taken almost verbatim from ICR writings. It is an extension of the fundamentalists' view that one must either accept the literal interpretation of Genesis or else believe in the godless system of evolution." Overton added that the two-model approach "is simply a contrived dualism" having no scientific basis or "legitimate educational purpose."

Had Overton stopped there, he would not have shown that the *primary* effect of Act 590 was the advancement of religion. He would only have established that, while promoting science, that was the Act's *secondary* effect. But Overton did not stop there; he went on to show that "creation science has no scientific

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merit or educational value as science." This point made it clear that "since creation science is not science, the conclusion is inescapable that the *only* real effect of Act 590 is the advancement of religion."

Overton showed that creationism was not science by first listing the essential characteristics of science: (1) it is guided by natural law; (2) it has to be explanatory by reference to natural law; (3) it is testable against the empirical world; (4) its conclusions are tentative, that is, are not necessarily the final word; and (5) it is falsifiable. He then argued that creation science failed to meet the characteristics because it required a supernatural intervention which is not guided by natural law and which "is not explanatory by reference to natural law, is not testable, and is not falsifiable." In support of this he pointed out that creationist methods "do not take data, weigh it against the opposing scientific data," and then reach conclusions. Instead, creationists "take the literal wording of the Book of Genesis and attempt to find scientific support for it."

Judge Overton's most devastating critique of creation science was probably the following comment:

> The proof in support of creation science consisted almost entirely of efforts to discredit the theory of evolution through a rehash of data and theories which have been before the scientific community for decades. The arguments asserted by creationists are not based upon new scientific evidence or laboratory data which has been ignored by the scientific community.

What remained was for Judge Overton to show that Act 590 would foster "an excessive government entanglement with religion." This he did by noting how school officials would constantly have to monitor materials and teaching activities to avoid religious references. "How is the teacher to respond to questions about a creation suddenly and out of nothing?" he asked. "How will a teacher explain the occurrence of a worldwide flood? . . . The answer is obvious because the only source of this information is ultimately contained in the Book of Genesis." He further noted that having the state screen texts for impermissible religious references "will require state officials to make delicate religious judgments." These activities would constitute excessive government entanglement with religion.

These were the main points in Judge Overton's decision. However, the document should be read in its entirety for the many details it has to offer. Copies can be secured for only $6.50 each (mailed first class) by writing to: ACLU of Arkansas, P.O. Box 2832, Little Rock, AR 72203. The *New York Times* published excerpts from the decision on January 6, and *Education Week* ran the whole text in its January 12 issue (Vol. 1, No. 16). The American Association for the Advancement of Science publication, *Science*, will run the text in a future issue, and the National Association of Biology Teachers publication, *American Biology Teacher*, plans to run the text in its March issue.

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The Aftermath

It is clear that creationists knew in advance that they were going to lose. A day before the trial ended, Duane Gish of ICR had spoken to reporters and said that he would not recommend that other states adopt similar creationism laws. Throughout the trial Arkansas Attorney General Steve Clark was under attack from his own side for the way he was handling the defense. Television evangelist Pat Robertson reportedly declared on a broadcast of his "700 Club" show that Clark was "crooked" and was trying to lose the creation trial on purpose. As a result of this statement, Clark consulted his personal attorney to decide whether or not to sue Robertson. In another attack on Clark, the Creation Science Legal Defense Fund issued a nine-page denunciation of him, which said that he was unprepared to defend Act 590.

Even before the trial got underway, creationists were making plans in the event of a loss. The law's sponsor, Senator James Holsted, had said, "But if we lose, it won't matter that much. If the law is unconstitutional, it'll be because of something in the language that's wrong. So we'll just change the wording and try again with another bill. . . . We've got a lot of time. Eventually we'll get one that's constitutional."

Perhaps Holsted was speaking with a knowledge of Paul Ellwanger's new revised version of the model bill. Ellwanger, who was probably impressed by the arguments in the ACLU's suit, had revised his original creation law so that it could now get around them and had begun circulating it in state legislatures across the country. "The new draft bill is very tight indeed," Ellwanger said.

Since this "revised edition" is now slated for consideration by at least twelve states, the changes should be examined in detail.

The first change is the title. It no longer speaks of "balanced treatment" but is instead called the "Unbiased Presentation of Creation-Science and Evolution-Science Bill." Ellwanger thinks that he has his opposition cornered with this gambit. "Liberals have objected to bias in education," he says, "now let's see them support the removal of bias."

In the statement of the bill's purpose, some new words are added and some old words are changed. The bill now has the additional purpose of making "public schools neutral" toward student beliefs. This implies that they are not neutral at present. Along this same line, the former purpose of *preventing* establishment of religion is now changed to a purpose of *ending* establishment of religion. Supposedly then, evolution is a religion established in the public schools.

But the most outstanding change is the removal or modification of any phrase that might make creationism look biblical. Thus, whereas the former version defined creation science as involving creation of the universe and life from nothing, the new version drops "from nothing" and replaces it with "suddenly." Reference to the worldwide flood is dropped so that creation science now only

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offers "rapid catastrophic processes" as the explanation for the earth's geology. Finally, the line about a "relatively recent inception of the earth and living kinds" now reads: "Consideration of several chronometric processes that could reliably indicate the ages of the earth and of life, including both those processes that indicate a multibillion year age and those processes that indicate a relatively more recent inception." This is a reiteration of the common creationist debate arguement that creationism is "open" to either the old earth or young earth options, while evolution is "limited" to only the old earth option. Such an approach makes it look as though creationists merely want science teachers to add scientific data that is often "hidden" from students.

A whole new section is added that explains what "unbiased presentation" amounts to. One part of this explanation speaks of giving the two models "an equal number of pages (adding together portions thereof) to the nearest 10 percent of the total pages in assigned textbook materials, but only to the extent such materials are available." This sort of thing "should get around the specific vagueness in the ACLU suit," Ellwanger says.

Another new section requires the use of existing funds to implement the law. Schools and school districts are only to use "currently authorized and future-authorized special or other textbook acquisition funds" to purchase the needed textbooks. This also applies to library books and teacher-training expenses. Ellwanger hopes by this addition to get around the political arguments of his opponents who frequently point out how much creationism will cost. Creationist books would be purchased simply by spending less money on standard books.

Since creationists are often accused of trying to, ultimately, get creationism taught alone, the "legislative findings of fact" in the model bill now try to show the opposite. For example, when it is claimed that teaching evolution exclusively "violates the constitutional principle of academic freedom," it is added, "just as presentation of only creation science would in the same way violate academic freedom." This sort of wording occurs again and again, hammering home the notion that this bill is very fair and even-handed.

Whether or not this wording will hid the real intent from any discerning judge is doubtful, but it will require more research on the part of the bill's opponents to dig up the facts as to what creationists are really after.

Ellwanger's strategy in getting this bill passed appeared to be that of getting it into state legislatures before the trial ended—or at least before the decision was issued and widely reported. He was partially successful in Mississippi, where the state senate voted forty-eight to four in favor of the bill. The vote came within houuse of the announcement of the Arkansas decision. The bill was then sent to the Mississippi House.

Bills had also been filed in the Senate and House of Florida before the Arkansas decision. However, in the case the decision caused a delay in the scheduling of these bills, which may be fatal to their passage.

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Meanwhile, in Louisiana where Ellwanger's earlier version was passed in 1981, the case is already in the courts. The ACLU filed its lawsuit on December 3, 1981. A trial date has not yet been set. Lousiana's state education superintendent has asked a federal couut to declare the law invalid, in light of the Arkansas decision. Creationists, however, will attempt to block such a move, because creationist lawyers Wendell Bird and John Whitehead have been deputized by the Louisiana state attorney general to assist him in defending the law. This will be their big chance to present the case the way they feel it should have been presented in Arkansas. Bird said that he had nothing against Arkansas Attorney General Clark but stated, "It does bother me that a very significant case was litigated in so haphazard a manner." Richard Bliss, speaking for ICR, noted that the Arkansas decision "will be a blow for us. . . . We are discouraged, but not defeated." He looks forward to the Louisiana case. His only worry is, "If we don't win that one, I don't know what to say. We will have no excuse at all."

However, another worry looms on the horizon. Clark is considering legal action against Bird for allegedly discouraging witnesses from testifying in the Arkansas trial. Bird had helped Clark round up witnesses before the trial, but he backed out when Clark wouldn't let him be a counsel of record—that is, a part of the Arkansas defense team. One attorney for Arkansas claims that Bird "wanted a share of the limelight." Bird apparently had later discouraged Dean Kenyon, a biologist from San Francisco State University, from testifying, because he thought Kenyon's reputation would be harmed. Kenyon abruptly left Little Rock the night before he was to testify and has refused to comment.

An attempt is being made to see if Bird violated any Arkansas law. If not, a complaint may still be filed with the California Bar Association, which could lead to Bird's disbarment.

The creation-evolution conflict clearly has not ended; new court battles are to be fought. Although Clark has stated that there is no basis for an appeal to the Eighth U.S. Circuit Court of Appeals in St. Louis, or any hope of overthrowing Judge Overton's decision directly, he says that the Louisiana case will have a better chance in the courts if there isn't the confusion of an appeal in Arkansas.

Meanwhile, many creationists have vowed to "take the offensive." Duane Gish, seeming to change his position a bit after learning of the decision, told a reporter, "If anything, creation scientists' efforts will be intensified." He called Overton's opinion "a very serious blow to academic and religious freedom." After the Mississippi State Senate passed their creationism bill, Senator Cecil Mills of Clara, Mississippi, declared, "If we're going to have a nation that says, 'In God We Trust,' let's go all the way or not at all."

So, even the loss of court cases doesn't seem to daunt the creationist movement. In fact, even if all variations of the model creation bill were ruled unconstitutional, the ongoing grass-roots efforts of creationists would probably continue. An indicator of this is the current problem now facing local California school dis-

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tricts as a result of the actions of a new creationist organization, the Creation Creed Committee.

The Creation Creed Committee is a California arm of the nationwide lobbying group, Christian Voice, the organization that targeted liberals for defeat in the past national election. The goal of the Committee is to stop what creationists think are local violations of the judge's decision in the California *Segraves* trial that took place in 1981. (In that case, the judge ruled that evolution could not be taught dogmatically.) Their plan of action has five parts.

First, the running of advertisements on Christian radio and television stations across the state, explaining the judge's decision and asking parents and others to alert the Committee to teachers and books that they suspect may be violating that decision by teaching evolution as fact instead of theory. Second, the enlisting of thousands of church goers and ministers to become "monitors" of their local schools. Their job would consist of "reminding authorities that the California Education Code holds each local board responsible for implementing policy decisions of the state board and that failure to do so may result in the withholding of county and state funds and the loss of teaching credentials for individual offenders."

The third part consists of the preparation of education kits and a film for those who will be monitoring the schools "so parents of children can more intelligently evaluate what children are being taught." Fourth, parents are to be encouraged to file suit against any local school board "which fails to bring its texts and teachers into compliance with the state codes." And fifth, warnings will be issued to local school districts and the state about questionable textbooks and teachers believed to be teaching evolution as fact.

Working with the Committee is the Creation-Science Research Center, which had figured prominently in the California lawsuit. Kelly Segraves, director of the Center, has stated that, "if the state ignores its own policy, we will sue them in federal court, charging constitutional violations as well as violations of the Civil Rights Act." He added, "We are not so much concerned with what teachers are teaching, but rather what lessons children are drawing from the dogmatic instruction of evolution."

Aside from the fact that such action by the Committee and CSRC amounts to a witch hunt, a further problem is that Segraves is misinterpreting the judge's decision and declaring that it means creationism must be given equal treatment in the classroom.

But even this sort of action is not the final creationist strategy. The action of last resort is civil disobedience. Francis A. Schaeffer, a leading fundamentalist intellectual, has just come out with a new book, *A Christian Manifesto*, which advocates the resort to force if the government persists in disobeying what he terms the "laws of God." Writing just before the Arkansas case went to trial, Schaeffer says:

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> The ACLU is acting as the arm of the humanist consensus to force its view on the *majority* of the Arkansas state officials.
>
> If there was ever a clearer example of the lower "magistrates" being treated with tyranny, it would be hard to find. And this would be a time, if the courts do rule tyrannically [that is, rule against the creationism law], for the state government to protest and refuse to submit.

Throughout the book, Schaeffer argues that, if legal protests don't work, civil disobedience and active demonstration should be used. He reminds his readers that they have no obligation to the state if it becomes "tyrannical" toward Christianity.

Such thinking by creationists could prolong the conflict long after all the legal battles are won. This is why there is no longer any question that the creation-evolution controversy will be with us for a long time. The victory in Arkansas is, at best, only a turning point in a long war.

Pope John Paul II on Creationism

In October of 1981, in an address to the Pontifical Academy of Science, Pope John Paul II said:

"Cosmogony and cosmology have always aroused great interest among peoples and religions. The Bible itself speaks to us of the origin of the universe and its make-up, not in order to provide us with a scientific treatise but in order to state the correct relationships of man with God and with the universe. Sacred Scripture wishes simply to declare that the world was created by God, and in order to teach this truth it expresses itself in the terms of the cosmology in use at the time of the writer. The Sacred Book likewise wishes to tell men that the world was not created as the seat of the gods, as was taught by other cosmogonies and cosmologies, but was rather created for the service of man and the glory of God. Any other teaching about the origin and make-up of the universe is alien to the intentions of the Bible, which does not wish to teach how heaven was but how one goes to heaven."

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News Briefs

Much of the news of what is happening around the country appears in the preceding article, particularly the section on the aftermath of the Arkansas decision. Therefore, that material will not be repeated here.

Science Meetings and Resolutions

On October 19, 1981, twenty-four leaders of science societies met under the auspices of the National Academy of Sciences in Washington, D.C., to share their awareness of the dangers posed by creationism. They also began the work of pooling their resources and developing a network of concerned organizations and activists. They determined that the task before them included the education of both the public and the scientific community to the true nature and importance of the creation-evolution controversy. Most of those present agreed that much of this problem was the result of public misunderstanding of the actual evidence for evolution and that this in turn was caused by inadequate teaching of science. Those societies working with education therefore determined to make improvement of science education a major priority.

The following day, the National Association of Biology Teachers called together representatives of twenty-five religious, educational, scientific, political, and industrial organizations. They met at the American Education Association building in Washington, D.C. The ideas of the previous day's meeting were expanded to apply to other organizations, and once again there was a pooling of resources toward the development of a network. The organizations present agreed to cooperate with one another and to educate their own members on the seriousness of the creationist threat to the public schools. *Creation/Evolution* was represented at both of these significant meetings.

In a mail ballot, the results of which were announced on November 30, 1981, the membership of the American Society of Biological Chemists voted 2,624 to 151 in favor of a statement opposing the teaching of creationism in the public schools. The statement also declared that evolution was in no sense a religious belief.

On January 4, 1982, the executive board of the 136,000 member American Association for the Advancement of Science, the nation's largest general science organization, passed a resolution opposing the teaching of scientific creationism in the public schools. The resolution also stated that creationism was not amenable to the scientific method.

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Creation Battles

On October 21, 1981, Representative William E. Dannemeyer of California proposed a bill in Congress (H.R. 4802) that would require that the Smithsonian Institution go through the annual congressional authorization process in order to get funding. Cited as the major reason for this bill was the fact that the museum presently has an exhibit entitled "The Dynamics of Evolution." Dannemeyer wanted Congress to be able to review this before allocating funds. His argument was that evolution may not be a fact, and then he quoted Duane Gish in an attempt to support this view. He also argued that evolution was part of the "religion of secular humanism."

Forty-two states now have a state Committee of Correspondence fighting creationism, and new states are expected to be added to the list. Some states are even forming subcommittees in order to combat creationist efforts in various parts of a state. Stan Weinberg, national coordinator for the Committees, reports that recent creationist activity in Canada, particularly in British Columbia and Ontario, will probably result in the formation of Committees there. States in which the Committees are going into action over proposed or soon-to-be-proposed bills include Arizona, Georgia, and Maryland. In Iowa, creationists will be making their seventh attempt at passing a creation law, after having lost on six previous occasions. If a bill is presented, it will probably be defeated; and, if it passes, the Iowa governor has already indicated that he will not sign it. A bill has already been defeated in South Carolina.

If you want information on how to contact the Committee of Correspondence for your state or how to form one if there is none, please write to Stan Weinberg in care of this journal. Committees are made up of scientists, educators and interested laypersons who desire to counter the creationist political efforts.

This past October, in San Jose, California, school board candidates in fifteen school and community college districts were given what could be called religious tests for political office. Two religious-based organizations, FAMPAC (Pro-Family Political Action Committee) and Concerned Citizens, sent all candidates a questionnaire, which asked their views on the subject of abortion, sex education, homosexuality, "voluntary prayer," and "the teaching of creation in the science classroom." Candidates were to fill out the questionnaire and then report to the San Jose headquarters of the Southern Baptist Association for a two-hour interview. The results of all this would then be tallied by the two groups and the names of the thirty-six candidates that they recommended would be printed on fliers to be distributed to the public by more than two hundred local churches. This all took place, but only 45 percent of the candidates filled out the questionnaires and came to the interviews.

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Jerry Falwell's media debate between Drs. Doolittle and Gish was aired once in Little Rock, Arkansas, at the time of the trial. It will be aired on network television this spring. To find out when it will be aired in your area, check your local listings or call the "Old Time Gospel Hour" at their twenty-four hour toll-free number, (800) 446-5000.

Letter to the Editor

The following letter was sent to Creation/Evolution *by John N. Clayton, instructor of science at Riley High School in South Bend, Indiana.*

I would like to respond to the letter by Garvin Chastain, printed in your Summer 1981 issue. Dr. Chastain made the very good observation that there is a need for people who can travel about presenting what he referred to as the "evolutionist perspective." There are those of us who have been attempting to get people to see that religion and science are not archenemies and that, in fact, if one assumes that they compliment one another, most of the difficulties between them dissolve.

Unfortunately, Dr. Chastain demonstrated in his letter one of the great problems that exist in this whole matter: the willingness of scientists, as well as religionists, to pigeonhole individuals into certain categories without even investigating the charges they are making. In his letter he referred to a series of lectures that I gave at Boise State University and classified me in such terms that lead me to believe that not only did he not attend the lectures but did not investigate the substance of them as well. May I point out that: (1) I am not a biology teacher; I am an earth science and physics teacher; (2) I am not a member of the creationist movement; (3) the lectures were not on the evolutionist-creationist question; and (4) the substance of the lectures dealt with the theme that, if there is a conflict between science and religion, we either have bad science or bad religion—and that there has been a great deal of both. One of the questions that we did deal with pointed out the errors involved in the creationist positions he discussed later in his letter. It is tragic that this kind of problem exists because it clouds the real issues and prevents the possibility of rational communication occurring between individuals who differ in opinions.

The frustration that Dr. Chastain mentioned, I think all of us are feeling; but the way to resolve the issues is to work with openness and a willingness to examine the different perspectives involved, rather than to lump people into various camps.

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FORTHCOMING SYMPOSIA CONTINUED FROM INSIDE FRONT COVER

Pacific Division of AAAS Meeting, Santa Barbara, California. On either June 22 or 23 (the final date has not been set) there will be an all-day symposium entitled "Evolutionists Confront Scientific Creationists." Since creationists claim that most scientists don't take creationism seriously and thus unfairly exclude creationists from meetings and publications, one objective of this symposium will be to dispel that claim by allowing for a direct confrontation between leading advocates of both sides in a scientific setting. Though not a debate, the testable aspects of the creationist viewpoint will be presented and then analyzed by specialists in those sciences treated by the creation model. The tentative agenda calls for an introduction by Frank Awbrey, followed by a full presentation of the creationist position by Harold Slusher and Duane Gish of the Institute for Creation Research. After that, analyses will follow. John Patterson will discuss thermodynamics; Russell Doolittle, the origin of life; G. Brent Dalrymple, the age of the earth; Patrick Abbot, geology; Joel Cracraft, systematics and fossils; William Thwaites, the design argument; and Vincent M. Sirich, human evolution. For details, contact Frank Awbrey or William Thwaites, Biology Department, San Diego State University, San Diego, CA 92182, (714) 265-5365.

1982 Annual Fellows' Meeting at Guilford College, August 8–13, Greensboro, North Carolina, sponsored by the Society for Values in Higher Education. Of the sixteen presentations on a variety of subjects, one is entitled "Religion and Science: The Creationist Debate." Contact John O. Stevenson, Jr., president, National Scholarship Service and Fund for Negro Students, 1501 Broadway, Suite 611, New York, NY 10036.

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